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NOVEMBER, 1894.

VOL. IV. NO. 5.

The Geographical Journal

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY.

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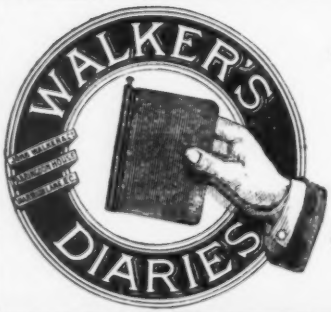

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Royal Geographical Society.

SESSION 1894-5.

PROVISIONAL PROGRAMME.

Alterations in the Society's Premises.

DURING the months of August and September the offices were closed, in order that such alterations might be made as the Council considered necessary for the greater convenience and comfort of the Fellows, for the accommodation of the rapidly growing Collections of the Society, and for the more efficient performance of the greatly increased work devolving upon the staff. The electric light has been introduced throughout the premises. The entire house has been re-decorated. Nearly the whole of the second floor has been reconstructed as an addition to the library, which has increased far beyond the accommodation afforded by the first floor. By other alterations in the third floor and in the basement, the constantly growing needs of the map department have been provided for.

The addition to the library on the second floor has been arranged with a special view to the accommodation of the greater number of Fellows who take advantage of the Society's collections for serious geographical work; this they will now be able to do with comfort and without distraction.

By certain changes in the old library, and by throwing open the Council Room to Fellows on days when it is not required for Meetings of Council or Committees, it is hoped that Members will be able more conveniently to inspect new books and serial publications, and to avail themselves in other respects of the advantages which the Society offers.

Ordinary Meetings.

The following are the dates on which the Ordinary Meetings of the Society will be held, at 8.30 P.M., in the Theatre of the University of London, Burlington Gardens (by permission of the Senate):—

1894.	Monday,	November	12, 26	1895.	Monday,	March 11, 25
	„	December	10		„	April 8
1895.	„	January	7, 28		„	May 13
	„	February	11, 25		„	„ Anniversary 27*
					„	June 17, 24

* The Anniversary Meeting will be held at 2.30 p.m.

So far the following arrangements have been made:—

November 12.—British Central Africa Protectorate. By H. H. JOHNSTON, C.B.

November 26.—A Journey to Tafilet, Morocco. By WALTER B. HARRIS.

December 10.—A Journey through Africa from the Cape to Uganda. By LIONEL DECLE.

The arrangement for the last-mentioned date is provisional. Other papers which may be expected after Christmas are the following:—

The Luchu Islands. By BASIL H. CHAMBERLAIN.
The Sierra Madre of Mexico. By O. HOWARTH.
Recent Explorations in Asia Minor. By D. G. HOGARTH.
North-West British Guiana. By G. G. DIXON.
Luristan and Fars. By S. BUTCHER.
A Journey across Southern Arabia from Oman to Aden. By J. THEODORE BENT.
Journeys in Cyrenaica. By H. WELD-BLUNDELL.

A New Periplus of the Erythrean Sea. By C. RAYMOND BEAZELEY.

The Alps: their Limits, Structure and Physiognomy. By W. M. CONWAY.

It is also expected that the Prince of MONACO will give an account of his recent researches in the Mediterranean and Atlantic. Other papers are being arranged for.

All the papers will, as usual, be illustrated by the oxy-hydrogen lantern.

The dates will be announced in the Notices to Fellows on page iv. of the Advertisements in the *Geographical Journal.*

Extra Meetings.

When considered necessary by the Council, Extra Meetings will be held, and will be announced in the usual way in the *Journal.*

Technical Meetings.

For the discussion of subjects of a specially technical nature, Meetings will be held in the Map-room (probably in the afternoon), and notice sent to all likely to be interested. It is hoped that in this way the Society may promote in an increasing degree the investigation of the scientific aspects of Geography.

Educational Lectures.

A Course of Twenty-five Lectures on the **History of Geography and of Geographical Discovery,** by Mr. H. J. MACKINDER, M.A., has been arranged under the joint auspices of the Society and the London University Extension. The Course will consist of Three Series, and will be delivered on Mondays at 6 p.m. in Gresham College. The first Lecture was given on October 8th. To these Lectures Fellows are admitted free on showing their tickets. Application for Programmes should be made to the Secretary, London University Extension, Charterhouse, E.C.

Christmas Lectures.

The Christmas Lectures to Young People will this Session be given by Dr. H. R. MILL, the Society's Librarian; the subject will be "Holiday Geography." Details will be announced in the *Journal.*

Anniversary Dinner and Receptions.

The Anniversary Dinner of the Society will take place on the evening of May 27th, 1895. The President and Council hope to be able to arrange for Two or Three Receptions during the Session, in the Society's own Premises.

Instructions for Intending Travellers.

Details as to the Society's arrangements for instruction to intending travellers can be obtained by applying to the Assistant Secretary.

Terms of Admission to the Society.

Candidates for admission into the Society must be proposed and seconded by Fellows, and it is necessary that the description and residence of such candidates should be clearly stated on their Certificates.

It is provided by Chapter IV., § 1, of the Regulations, that,

"Every Ordinary Fellow shall, on his election, be required to pay £5 "as his admission fee, and £2 as his first annual subscription, or he may "compound either at his entrance by one payment of £35, or at any "subsequent period on the following basis :—

Fellows of	20 years' standing and over	.. ..	£12 10s.
„	15 „ „	and under 20.. ..	£16
„	10 „ „	„ 15.. ..	£20

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All Subscriptions are payable in advance, on the 1st of January in each year.

The privileges of a Fellow include admission (with one friend) to all ordinary Meetings of the Society, and the use of the Library and Map-room. Each Fellow is also entitled to receive a copy of all the Society's periodical publications.

Copies of the Regulations and Candidates' Certificates, as also Tickets for the Lectures, may be had on application to the Secretary, 1 Savile Row, London, W.

H. SEEBOHM
L. DARWIN } *Honorary Secretaries.*

The Geographical Journal.

Authors are alone responsible for their respective statements. In MS. communications all new or unfamiliar geographical names should be written in imitation of Roman type.

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THE SOCIETY
The New Session
The Society's Prizes and Certificates to Training College Candidates

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Dr. Sven Hedin in Central Asia
Colonel Holdich on the Route of Alexander the Great
Mr. Bent's Expedition to the Hadramut

AFRICA
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The French Protectorate on the Ivory Coast
The Health of Europeans on Mount Kilimanjaro
A Visit to Lake Mweru

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The Peary Polar Expedition
Mr. Trevor-Battye on Kolguef Island

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The
Geographical Journal.

No. 5. NOVEMBER, 1894. Vol. IV.

MONTENEGRO AND ITS BORDERLANDS.*

By W. H. COZENS-HARDY, M.A.

In bringing to the notice of the Geographical Society Montenegro and its Borderlands, it is with some degree of diffidence that I hazard the suggestion that on a district of Europe it is possible to say "anything new that is true, or anything true that is new." I feel bound, moreover, to apologize for drawing attention to the fact that this Society, after more than half a century's existence, has not rendered my task impossible by having already performed it. But this fact is not to be evaded; and it supplies the reason—may it also be the excuse?—for a paper on Montenegro and its Borderlands. The district, then, is still, to all intents and purposes, unknown. Maps, if they exist at all, are chiefly interesting as imaginative studies. Mountains are marked with a vagueness which scorns details; islands appear where no islands are; rivers which run south on the map, run north in reality. But the interest of this region is not confined to its topography. The politician here has many an enigma to unravel. Ethnography can find no greater variety of races, no more curious manners and customs; while ballad and epic verse—still in process of growth—may attract the student of literature.

The more immediate object of my third visit to Montenegro last year was to find the solution of a problem which had for some time perplexed me; namely, what had become of the Montenegrin frontier since the treaty of Berlin. Blue books were silent on the subject; the Foreign Office had no information. The original European Commission

* Paper read at the Royal Geographical Society, March 12, 1894. Map, p. 480.

had settled the Eastern frontier between the Lake of Scutari and the sea, had surveyed some part of the frontier to the north, and had then adjourned *sine die*, without completing its labours. Rumour suggested that the various powers concerned had been busying themselves in tinkering their respective frontiers on their own account. My own fascination for this problem is not shared, I imagine, by every one. I may, however, say that a fortunate combination of circumstances enabled me to find its solution, and to fill up the gap in the political geography of this region, at any rate, to my own satisfaction. To my own faith in the merits of this solution I will not attempt to make converts in this paper. I would rather give some general account of the countries and their peoples; and, in the first place, of Montenegro.

The chief interest of the voyage down the Dalmatian coast consists in the relics of Roman and Venetian splendours with which it is lined, and the magnificent scenery of that Austrian fjord, the Bocche di Cattaro. From Cattaro, the last Dalmatian town, the road to Montenegro winds up the steep mountain side in endless zigzags. Above these, soon after crossing the Montenegrin frontier, the view extends over the Bocche di Cattaro and the Herzegovinian mountains on the one side, and the Adriatic coast on the other; and at night, when the shore lights are reflected in the water 3000 feet below, the impression is most striking. In a moment, however, the scenery changes. Turning the corner, there opens out a large rocky basin, completely shut in by limestone mountains. Imagine a circle of hills rising 400 feet all round; the rocks bare and grey, except where a few stunted beech or oak trees break the monotony. Let these hills enclose a floor of earth, in which a few crops are visible. Scatter over the flat ground and on the slopes of the hills, at intervals of a quarter of a mile, a few one-storied, one-doored, one-windowed huts, the walls of stone, the roofs of straw. The result is the characteristic Montenegrin village in the characteristic Montenegrin landscape. Diminish the size of the hills; decrease the area of the ground they enclose; put in patches of maize the size of a tablecloth, and potato-fields no bigger than a handkerchief; combine hundreds of these side by side at elevations of 2000 to 3000 feet; connect them by tracks three feet broad, winding over limestone boulders, and covered with a loose, sliding surface of limestone blocks of all sizes;—there you have Montenegro. Water is nowhere to be seen. There are only two rivers in the country. The principal one—the Zeta—disappears into a chasm on the plain of Nikšić, and reappears out of the ground, miles away, at the head of the Zeta valley,—the one valley, and the only fertile part, of Montenegro. Passing the monastery of Ostrog, the modern village of Danilovgrad, and the old Turkish fortress of Spuž, the Zeta joins the other river, the Morača, at Dukle, where Mr. Munro, of Lincoln College, Oxford, spent some weeks last autumn conducting the excavation of the old Roman town of Dioclea, the

supposed birthplace of the Emperor Diocletian. The Morača, rising in the mountains north of the Morača monastery, flows between stony banks along which no track leads. The two rivers, which below their junction bear the joint name of Zeta, cross the plain of Podgorica, and so reach the Lake of Scutari. One other river should, perhaps, be added to the list—a short stream which makes a mysterious appearance from a huge unexplored cavern at Rijeka, and, after a swampy course of three miles, is swallowed up in the lake. Montenegro exhibits the ordinary peculiarities of similar geological formations. Rivers suddenly rise, fully formed, from the rocks, and disappear as suddenly. It is the same in all the Karst district. This absence of water produces strange results. For

FIG. 1.—A MONTENEGRIN VILLAGE.

drinking, the people use old rain water, which is generally stored in petroleum tins, invariably made in Russia, but as invariably bearing the English inscription, "Best refined petroleum;" or else they use snow. For myself, I have preferred the pangs of thirst to the pleasures of drinking in September the dirty melted snow of the preceding winter. There is a Montenegrin saying, that when God was creating the world, He carried the rocks in a sack. The sack broke over Montenegro, and all the stones in it fell on that unhappy land. Whatever may be the merits of this legend as an explanation, it is certainly a picturesque and accurate description of the geographical features of the country.

Beyond the limestone basin above the Cattaro zigzags, in which lies

the village of Njeguš, there suddenly comes into sight over the dreary wastes of rock in the foreground a view of welcome beauty—range after range of the distant Albanian mountains never free from snow, and at their foot the broad expanse of the Lake of Scutari. The next large basin holds Cetinje, the capital. A collection of 200 small houses on each side of one long street, the village has few qualifications for a metropolis. It lies in one corner of the principality. It is not as large, nor as important commercially, as Podgorica or Nikšić. The only reason adduced for keeping it is, that to leave it for Europe is so easy. I use the word "Europe" deliberately; for, according to local usage, Montenegro is not in Europe, nor are the Montenegrins Europeans. When I reached the capital last July, the whole country was preparing to celebrate the four hundredth anniversary of the establishment of the earliest Slavonic printing press in the country. In 1493, before either Oxford or Cambridge had a permanent press, the Montenegrin ruler, Crnojević, set up a printing establishment at Obod. Books were printed there at that date, some of which I came across by accident in the old monastery church at Čajnica, just over the Bosnian frontier. In honour of this anniversary, universities and learned societies of Europe, the University of Oxford included, sent addresses of congratulation, while the Clarendon Press gave the Prince the appropriate present of a collection of books as specimens of modern English printing.

During these *fêtes* the centre of attraction was the square opening out of the main street of Cetinje. On one side is the modern palace of the Prince; on the other stands the old palace, the usual name for which—"the Billiard Saloon"—is a lasting evidence of the impression left on the minds of the people, when their late Prince Danilo imported a billiard-table and played on it in this building. Between these two palaces stands a large tree, beneath which the Prince displays himself every afternoon, and administers justice to his subjects. In this square, and in the streets as well, the populace were singing and dancing for a week. Of the dances there were three varieties. One, the "zetsko kolo," was danced by Albanians from Podgorica; fifteen of them, standing in an incomplete ring, slowly circled round, singing the words of a song in honour of Albanian prowess, composed by the Prince to satisfy his new subjects after the war. All these dancers were in full dress, the most remarkable part of which is a petticoat reaching to the knee, made of white linen, 60 yards in width. The weight of this costume—and I speak from personal experience—is very great; but the more yards in the garment, the greater dandy is the wearer. Another dance, the "cermničko kolo," consists of a ring of men or women with linked arms, who circle round, singing and jumping simultaneously into the air. Of this, the most complicated form, which I have only seen once, consists of two rings of men, one inside the other, with a third on the shoulders of the inside ring, who in

the usual way sing and jump. In the third variety of dance, locally called the "oro," or eagle dance, two men or a man and a woman inside a ring of singers jump into the air, waving their arms and uttering shrill cries, supposed to resemble the eagle's shriek. The name of this dance is no doubt derived from the Greek word χόρος, which appears in the Roumanian "horo," and the shrieks of the dancers have been introduced to accommodate the dance to its supposed connection with the Montenegrin word for "eagle." To the disinterested spectator at a safe distance, the most effective variety of this dance is when it takes place on board a rickety boat, and the performers, in addition to the usual peculiarities of the dance, fire off revolvers and wave their yataghans or swords in the air as they jump. The opportunity the *fête* gave for observing the varieties of Montenegrin costume was unique. From Nikšić one afternoon came in 150 horsemen all wearing breast-plates of silver and gold; while Podgorica and Dulcigno sent bands of the Mussulman Montenegrins all in their peculiar dress. The national costume, always worn, whether at home or in war, is particularly striking. It is made up of a red embroidered waistcoat under a long frock coat of pale green, white, red, or blue; loose baggy blue knickerbockers, with knee-boots or white stockings and hide shoes; and round the waist a belt of silk, which always holds a revolver, generally a yataghan, and sometimes an extra knife or pistol. On the head is worn the peculiar Montenegrin cap. This is small and circular, black on the sides as a sign of mourning for the overthrow of the old Servian kingdom at the battle of Kosovo 500 years ago; red on the top to signify the blood shed to avert that defeat; while in addition to the letters "N. I.," *i.e.* "Nicholas the First," the gold semicircle of a rising sun denotes the ultimate triumph of a new Servian power. The spectacle of the town crowded with brilliant costumes of all colours, worn by men of imposing height and magnificent carriage—the Montenegrins are probably the finest race physically in Europe—was exceedingly picturesque. Nor does the women's dress lack grace and charm, though, with its black and white hues, it is more sober, as befits the workers. In Montenegro it is the women who do the work. For the men, war is their chief occupation and their first thought. To this is due the fact that the rhapsodist of the Homeric type is still to be found among them. At evening in any Montenegrin village, the epic bard can be heard chanting songs—handed down from father to son — and accompanying himself with the "gusle," a one-stringed violin. The singer chants in tones our scale does not recognize, until every particle of breath is exhausted from his lungs. Then with a loud gasp he takes in more air, and without a pause continues his song. The bard is a privileged person. He is the only man who is allowed to beg from place to place—all other paupers are rigorously confined to their own village—while, if blind, he has the right of sitting on the palace

steps to sing. It was remarkable, as showing the strength of the poetic feeling of the people, that the greatest enthusiasm during the *fêtes* was aroused by a blind bard, who sat on the palace steps and sang of the recent wars with the Turks. He was listened to by the crowded square in strained silence, only relieved now and then by rapturous bursts of applause. On the eve of the principal day of the *fête*, there was a magnificent illumination of Cetinje and its amphitheatre of hills, when every peak was brilliant with countless lamps of clay and petroleum.

For the following day the programme was a long one. After the presentation of the addresses to the Prince, there were two services, one a funeral service in memory of the founder of the printing press, and the other a service of thanksgiving. Inside the chapels of the palace and the monastery while these services were being conducted, the gorgeous colours of the ecclesiastical vestments, the brilliant uniforms of the foreign representatives, the state dress of the Prince and his family and of the Montenegrin officials, composed a picturesque and effective scene. A banquet in the open air, at which 2000 people sat down, and during which some thirty-two speeches were made and some horseraces, the first ever held in Montenegro, brought the day to a close. With the following day began an excursion into the interior to Podgorica, a large commercial town, half Turkish, just north of the Lake of Scutari. Everywhere along the road private houses and local communes had brought out of their best. Every village provided a banquet, speeches, and dances; and the most lonely roadside hut never failed to have a table in front of its door, spread with bread and meat, wine and raki, the national spirit, which any one was free to take. The largest banquet took place at Podgorica, where the tables were laid in the open fields. The following day was occupied by an excursion to the small island of Starčevo, in the Lake of Scutari. Here the programme consisted of a service in the tiny church, a banquet of fruit, and a dance by the Albanian-speaking women, bareheaded in the blazing sun. Cetinje was reached the same evening; and such was the end of the *fête*. Throughout the week nothing had been said that could give offence to any other nation. The semi-national, semi-literary character of the celebration was entirely kept up. Personally, I can only congratulate myself on the good fortune which made me a spectator of these *fêtes*. It enabled me to see a genuinely Montenegrin festival, observed with the national customs; and, more than that, by bringing me into contact with people from all parts of the principality, it immensely facilitated my subsequent journeys in a country where the people are naturally suspicious of the foreigner.

So far I have been dealing exclusively with the old Montenegro. For it is a convenient, though not an absolutely accurate, classification to divide that country into the new and the old. The two are entirely distinct. There is, however, one part of Montenegro which occupies an

intermediate position between these two, and that is the plain of Podgorica, the Lake of Scutari, and the strip of land separating the Lake of Scutari from the sea. The Podgorica plain, which stretches from the junction of the rivers Morača and Zeta above Podgorica down to the Lake of Scutari, is the only part of Montenegro which lies at or near the sea-level. The soil here is fertile; but the possibilities of its cultivation are less than they might be, owing to the annual floods which swamp the low-lying lands on the borders of the lake. The water rises in the autumn, and throughout the winter covers the crops. The cause of these inundations is the incapacity of the river Bojana—the only outlet from the lake to the sea—to carry off all the water; for the rivers rise with great rapidity. In Albania, I have seen a dry river-bed, a quarter of a mile across, turned by an hour's storm into a raging and impassable torrent. The remedy for this evil is the rectification and deepening of the course of the Bojana, in order to regulate the outflow from the lake.

The Lake of Scutari itself, one half of which has been added to Montenegro by the Berlin treaty, resembles the Lake of Garda in size and in the beauty of its scenery. From Rijeka onwards the marshes are full of wading birds. Thousands of duck are found at the head of the lake; while all over it huge white pelicans lazily float.

Between the lake and the sea the country is mountainous, dry, and barren, with the exception of one small valley behind Vir Bazar. From this town a carriage road leads to Antivari, after crossing the Sutorman range of mountains, 5000 feet high. The old Venetian and Turkish city of Antivari stands two miles inland, looking down over the half-dozen houses of Pristan, which lie on the flat shore and form the tiny port. The carriage road goes no further than Antivari. To Dulcigno the path is even worse than usual, and, though at first large woods of old olive trees diversify the scenery, the general characteristics of the country remain the same. Beyond Dulcigno to the Bojana stretches a flat plain, the swamps of which have now been partially drained. Neither Antivari nor Dulcigno is at present of much value as a port. At Antivari there is no shelter; while the minute bay on which Dulcigno lies, is exposed to the full force of the Adriatic.

From the old Montenegro to the new the transition is in places dramatic in its suddenness. I have been on a mountain ridge, where on one side stretched the arid Montenegrin landscape, while on the other lay a new and fairer Montenegro, where the bare rocks yielded to grassy mountains, the treeless slopes gave place to dense primæval forests, and waterless tracts became fertile valleys, lavishly watered by mountain streams. So great is the change from the old to the new. It is in this new Montenegro that the loftiest mountains are. My ambitions had long been centred on the highest—Durmitor. But the mountain always seemed to bring discomfiture, and I almost fear that

the spirit, which according to local tradition haunts every mountain-top in Montenegro, must have determined to baffle my endeavours to ascend it. My first attempt, two years previously, had been baulked by the prosaic obstacle of want of food. I had scoured Podgorica for a supply of tinned sardines, supposed to be caught and cured locally. But the most diligent investigations only discovered—and it was in a ropeseller's shop—one tin. It was an English biscuit tin, and empty. Without sardines Durmitor was inaccessible. Last year I made another attempt; but a week's bad weather dogged my footsteps, and though, drenched to the skin and almost frozen, I did succeed in dragging from Žabljak to the highest summit, called Čirova Pećina, four reluctant Montenegrins, who pleaded wind and rain as valid excuses for retreat, the driving mist hid anything more than three feet away. What I thus lost I can the more appreciate from the charm of the scenery and the beauty of the views of the Durmitor country, which I obtained when making my way to Nikšić from the junction of the Tara and the Piva rivers. Between these two rivers, which flow on each side of Durmitor in deep wood-lined gorges, the lofty grass lands stretch for miles unbroken, and the forty lakes give the district the name of Jezera, or the lake country. I reached the Piva, far from any human habitation, one evening after sunset. The thick forests, clothing the precipitous banks of the defile 2000 feet deep, through which the river flows, gave a sombre awe to the scene. In reply to shouts, there came across the stream, out of the darkness, three logs of wood, loosely bound together with twigs of willow. An aged ferryman propelled them. On this frail craft the horses were sent across one by one. When the turn of us human beings came, the weird solemnity of the scene and the accompaniments of the crossing made it difficult to imagine that we were not souls in the infernal regions, whom this Montenegrin Charon was ferrying in silence across the Styx.

Next to Durmitor in height, and connected with it by the range of mountains along which the old frontier ran, is Kom, at the eastern extremity of the country. Coming from Podgorica, on my way to Kom, and leaving the stony country which extends up to Zatrijebač, I ascended the peak Maglić, which gives the most beautiful view of any in Montenegro, including all the Albanian mountains to the south, and the double peak of Kom and the other Montenegrin ranges to the north. From Maglić the path leads northwards over a narrow saddle—an ideal watershed—thirty feet wide, separating the Velipolje valley, with its steep slopes, from the valley of the Tara to the west. From this point, as I looked over the forests far below me in the valley, I caught sight, for the first time, of the wooden buildings and trees and gardens of that mysterious town whose actual inaccessibility and rumoured fanaticism exercise so potent a fascination upon the Albanian traveller—Gusinje. Near here I received a visit from two emissaries

from that town, sent to find out what I was doing, and to enjoin me not to go to Gusinje. There were good men and bad men there, they told me, but the bad men were stronger than the good; they thought, they added, that I was bringing money and documents to buy Gusinje and hand it over to Montenegro. Near here, too, an old Montenegrin, armed with a muzzle-loading silver musket, appealed to me to prevail on the Prince to allow the Montenegrins to attack Gusinje and take it for their own; they could do so with perfect ease, he said, if only the Prince would give permission. At one part of the route just here, the Montenegrins with me told me, every few hundred yards, blood-curdling stories—how behind that rock the Gusinjotes laid in wait last summer

FIG. 2.—THE KOM RANGE, FROM MAGLIČ.
(*From a photograph by Mr. J. A. R. Munro.*)

for one of their own chiefs, and shot him as he went; how on that spot had fallen, three months ago, another victim to the inexorable decrees of the blood-feud. It was here, too, that our tents were hurriedly withdrawn one evening from the top of a conspicuous hill on the Montenegrin side of the frontier, because they were supposed to present too attractive a mark for desultory rifle-practice from Gusinje. The proper method, it is said, of using a tent in Albania, is to pitch it and then sleep under a tree a hundred yards away. The tent, and not its owner, is bullet-riddled in the morning. At last I found myself on the southern slopes of Kom, at Carina, where, at a height of 6000 feet, a camp was pitched, among some Albanian-speaking Montenegrin

shepherds. From Carina the ascent to the highest summit, called Kučki-Kom, leads over the shale and rock slopes of the crater-like basin separating the two main peaks. Along the route were growing all the ordinary higher Alpine flowers, noticeably the dark-blue gentian and the yellow poppy; the edelweiss alone was nowhere visible. Though no stranger had ever ascended this mountain, the climb was not particularly difficult. One thing, however, did create a great sensation, and formed the topic of conversation among the natives for long afterwards. This was the use of a rope by Mr. Munro and myself to ascend the face of a limestone cliff by a convenient gully. The native mind could not understand it. The solitary Montenegrin, braver and more active than his comrades, who managed to reach the top by a circuitous route, refused on any account to be roped in the descent; if either of us fell, he said, we should pull him down too.

East and north of Kom are the Vasojevići people—in their own estimation, and certainly in mine, the flower of Montenegro. In this district, formerly independent both of Turkey and Montenegro, but now under Montenegrin rule, the houses and dress of the people are different from those elsewhere. The houses are not stone or thatched, but have high pointed roofs, the characteristic of all village houses throughout Bosnia. The usual Montenegrin dress is replaced by the tight-fitting white trousers, braided with black, of the Albanians over the frontier. The chief town of the Vasojevići is Andrijevica—twenty houses in a broad street—charmingly situated among wooded hills, where three rivers meet.

From Andrijevica I went to Berani, in Albania, visited the Roman remains at Budimlje, and some caves covered with early Christian symbols in the valley of the Lim, and the following day I proposed to cross the frontier by the Šiško lake to reach the Biogradsko lake, in Montenegro. The Governor of Berani came with us to a Turkish block house, not far from the frontier, and sent us on our way with a horse, a load of bread, and an escort of an officer and ten men. We parted with protestations of undying friendship, and as I rode away, he bestowed on me, as a token of regard, a diminutive cucumber. From the block house we went through Alpine pastures, over which were dotted low huts with bark roofs, and which the beech-glades made curiously like an English park. As it got dusk, we neared the Šiško lake. The Turkish soldiers, who were to escort us to the frontier, had no food or shelter; and as neither their officer nor the Montenegrin officer with me could see any serious international objection, it was arranged that the Turks should come to our tents, which were expected to be a few minutes across the frontier. Just after sunset we reached the shepherds' huts, 6000 feet above the sea, which form the village of Šiško. Here, to our dismay, we found from the inhabitants that the tents had been seen pitched close to the Biogradsko lake, five hours away. It was too dark and

too late to go on. If we stayed where we were, what was to become of the Turkish soldiers, who were our guests? After some deliberation, it was settled to quarter them in the village, and to take the chance of a riot. So the biggest hut was prepared for ourselves and the Turkish officer, and the privates were distributed by twos among the other huts. It was a comforting reflection that none of these Turks could speak one word of Montenegrin; nor was sour milk—the only drink—likely to make them unduly excited. So the chances in favour of peace seemed strong. Unfortunately, the horse and bread had not arrived, and a Montenegrin, returning later in the evening, reported that they were two hours distant, on the Turkish side of the frontier. The Turkish

FIG. 3.—ANDRIJEVICA.

officer wished to send his men to look for it. But instead of this somewhat risky project of despatching a band of Turks to scour, at the dead of night, the country of their hereditary foes, a squad of Montenegrins was sent off to look for the bread, and the Turkish officer and his bugler went on a hilltop near to try and rouse the nearest Turkish fort to send back the missing animal. Two attempts proved unsuccessful. No answering bugle notes were heard. Our bugle calls were drowned by the noise of the distant streams and by the slight breeze blowing in the wrong direction. Finally, however, the Montenegrins who had been despatched returned in triumph with the horse and its load, and all the inhabitants spent the rest of the night, crowded into our hut, in feeding

us with roast sheep and apples round the fire, and in singing songs. There was no disturbance during the night. The pleasure of shooting a handful of their foes had yielded to their hospitable Montenegrin instincts. The following morning, the Montenegrins escorted their guests back to the frontier, and refused to accept any payment for all the entertainment they had given them; while we continued our journey to the Biogradsko lake. It lies below the upland pastures of Šiško, and is surrounded by dense forests filled with chamois, deer, and bears—the prettiest spot in Montenegro. On each side the slopes are thickly covered with trees, except where, at their summits, stretch rich grass pastures; while the clear waters of the lake itself, filled with

FIG. 4.—BIOGRADSKO LAKE.
(*From a photograph by Mr. J. A. R. Munro.*)

trout, reflect the woods that fringe its shores. The first picture of Montenegro — the stony basin above the zigzags — was drear and desolate, characteristic of the old Montenegro. Let me leave that country with the Biogradsko lake, the grass and woods of which are the type of the newer Montenegro.

But before passing to Turkey, let me say a few words as to the people themselves. I should extremely regret if I failed to convey some of my own enthusiasm for the Montenegrin people. I cannot subscribe to the orthodox view that the name of the country—the "Black Mountain"—is derived from the "black hearts" of the people. Montenegro is not like that Armenian town, whose character is summed up in the saying, "Black walls, black dogs, black

mountains, black hearts." And, if I may digress for a moment, let me say that, in my opinion, the colour of the mountains has as little to do with the name. I have seen the mountains from all sides and in all parts. They are not black, but white. It seems more probable that, as the name "Crnagora," "the Black Mountain," is unknown before the reign of Crnojević, the "Black Prince," four hundred years ago, the man gave his name to the mountain, and not the mountains to the men. The people themselves are not a race of savage barbarians. Every man, even the poorest, has the bearing and dignity of a gentleman. Education is universal and compulsory on all children over seven. Theft is unknown, drunkenness unheard of. Women are universally respected; a woman goes in safety where no man dares.

Their government may be paternal. A friend of mine told me one day he had just put five men into prison for some months. I asked him why. For saying, he replied, that they had seen after dark a figure dressed in white, sitting on a grave. Ghost stories, he told me, were bad for public morals. Their government may be despotic; but, though the Prince appoints all officials, it is always the best men who are found filling every grade of office throughout the country. In Montenegro, at any rate, a benevolent despotism has produced results a democracy often fails to realize. Nor ought it to be forgotten that in Montenegro they have long had a complete system of local government. Among this people, 300,000 all told, there are 500 village councils, elected every three years, ruled by popularly elected officials, levying rates, owning land, distributing charities, appointing supervisors of education (whose duty it is to deliver popular lectures on its advantages), and finding the solution of the problem of women's rights in allowing women to speak in the village meetings as long and as often as they may wish, but to vote not at all. The Montenegrin people are in a stage of transition. Pot-shots at Albanians now involve serious diplomatic consequences. They must abandon their Homeric condition, and renounce their epic ideas. The country has acquired ample resources; it is for its inhabitants to develop them. At present, however, they have not shaken off their old idea that every occupation, except fighting, is beneath the dignity of a man. Little has been done to open up their country. Corn is not produced in sufficient quantity to supply the inhabitants, and wine is drunk where it is made. The trade in dried fish and insect-powder—the chief exports—is small. In the timber and cattle lie the possibilities of development. The cattle trade engages the attention of the natives; the trees attract foreign speculators. Cattle are shipped to Malta, Austria, Italy, and France. For the timber nothing can be done, until the access to the forests is improved. It remains, then, for the people to adapt themselves to their altered conditions. On their ability so to do depends the future of Montenegro.

The Sandjak of Novi Bazar.

From Montenegro I went to the Sandjak or district of Novi Bazar, which lies on the north-east frontier of Montenegro, dividing that principality from Servia, and extending from Mitrovica—the terminus of the railway from Salonica—north-west to the Bosnian frontier. Strictly speaking, the modern Sandjak of Novi Bazar is smaller than the old one, but it is convenient to use the term in its old sense as including all the country up to the Bosnian frontier. Politically, this district has a peculiar importance. The direct road to Salonica from the west passes through it; the Berlin treaty has revolutionized its constitution. By this treaty Austria was empowered to occupy Bosnia, Herzegovina, and the Sandjak of Novi Bazar; but, as the Austrian Government was not desirous of undertaking the administration of the Sandjak, it was agreed that the Ottoman administration should continue to exercise its functions there. Austria, however, reserved the right of keeping garrisons, and having military and commercial roads in the whole of the old Sandjak; and to this end the two governments arranged to come to an understanding as to the details. A convention was accordingly arrived at in 1879, by which it was agreed that the presence of Austrian troops in the Sandjak should not interfere with the functions of the Ottoman administrative authorities, which were to continue to be exercised, as in former times, under the exclusive and direct orders of the Sublime Porte. In accordance with these arrangements, the Austrian Government has posted its troops at three towns close to the Bosnian frontier, Priboj, Tašlidja, and Prijepolje. Across the river Lim it is understood the Austrians shall not go. There is, then, in the Sandjak a Turkish civil and military administration of all, and an Austrian military occupation of part. The interest of the Sandjak as a political experiment is increased by the absence of geographical information respecting it. Travellers here are few. It is difficult of access; it has no railways and no proper carriage roads.

Coming into the Sandjak from Berani, on the eastern Montenegrin frontier, the first town that I reached was Bijelopolje. My visit solved the mystery of the existence of an apparently important town, called Akova, which, on several maps published within the last ten years, appears some fifty miles to the north of Bijelopolje. Akova has in reality no separate existence. It is the Turkish form of the Servian name of the town, and it was only the imagination of the map-makers, which had evolved two towns from one. The Lim, the only river of any size in the Sandjak, flows past Bijelopolje, and the houses rise steeply from one bank of the river, while in the middle stands out a tall white campanile of a Christian church, which has now become the chief mosque. The arrival of the first hat-wearing strangers was not an event which the people could allow to pass unnoticed. Outside the town, where the

troops were drawn up in line, they were assembled in crowds to gaze. Inside, as soon as the bridge was passed and the tortuous hilly lanes of the bazaar were reached, it was evident that the greater part of the inhabitants had turned out to witness the unusual sight. Every window was crowded with turbaned heads; fezes lined the streets; children stood on all the booths and stared in open-mouthed amazement. Speculators in seats to view the procession must have reaped a large harvest that day. As the people here are almost entirely Mussulman, and the town stands quite out of the world, Bijelopolje is at present perhaps the most fanatical place in the Sandjak. I had accordingly refused to enter the chief mosque, and had contented myself with inspecting the campanile from the outside, for I was anxious not to offend the susceptibilities of the people. There was no disturbance the night I stayed in town. A Christian, however, who left Bijelopolje the day after I did, brought word that the Mussulman population were much excited. In my looking at the outside of the mosque, they saw, he said, an attempt to upset their faith! They could not conceive what dark political motive I had in visiting their town, and, had I stayed there any longer, they would have risen against the European. Fortunately he had gone, before they converted their thoughts into deeds.

From Bijelopolje I made my way to Sijenica, the administrative centre of the Sandjak. It lies on an undulating tableland which extends northwards up to the Servian frontier, and eastwards and westwards for many miles. Not a tree is visible; there are scanty signs of cultivation; houses are few. It is a gigantic pasture land, not unlike the English downs. Hay is plentiful—three crops in the year; and the third crop—in cock—was, when I passed through, scattered over the plain. Each peasant, however poor he may be, has two or three horses and two or three cows. During the six months in the year for which the snow, at this height of 3500 feet, is thick on the ground, the stock require all the hay the land produces, and thus all export of the crop is prevented.

Four or five hours east of the straggling village of Sijenica the undulating grass country comes to an end, and the road to Novi Bazar follows a small stream, which flows between low-wooded hills, broadening out into a basin, in which the town of Novi Bazar lies. By some mistake our usual military escort had been dispensed with between Sijenica and Novi Bazar, and we had been accompanied only by some mounted zaptiehs, or constabulary. This led the Governor of Sijenica to despatch an urgent telegram to Novi Bazar to the effect that on no account was the return journey to be made without an escort of soldiers. There is no cavalry at Novi Bazar; but the ingenuity of the commander was equal to this emergency. A squadron was hastily improvised by turning pack-horses into chargers and

mounting the infantry upon them. As the saddles were two pieces of board meeting at an acute angle over the horse's back, I did not envy the new-formed cavalry their ten hours' jog-trot back to Sijenica.

North-west of Sijenica the character of the country continues much the same. There are still the treeless, grassy downs and shallow depressions. Haycocks were still dotted over the pastures, and herds of sheep and cattle still visible on each side. Towards Nova Varoš the country changes its aspect. The forest region begins, and after passing through pine woods the town of Nova Varoš comes into view, picturesquely situated on each side of a steep valley not 200 yards broad. Nova Varoš, formerly the centre of a large cattle trade, has now been left stranded by the tide of commerce. The large orthodox church, built at the height of the town's prosperity fifty years ago, alone bears witness to the past. But the Christians are now too poor to provide it with bells, and a wooden plank, beaten with a hammer, is used instead. To-day the only industry is the manufacture of carpets and rugs. Every girl, on marriage, takes one or more rugs and a large painted chest to her husband. For this reason each house makes its own rugs, and each house uses what it makes.

From Nova Varoš to Prijepolje is a ride of three hours, part of the way through magnificent forests of fir and beech. At Prijepolje we again reached the Lim. Coming from the East, this town is the first place where the familiar Austrian uniform meets the eye, for here begins the curious anomaly of the double occupation of the country by Austrian and Turkish troops. To Tašlidja the road, along which run two distinct telegraph lines, one Turkish and the other Austrian, each with its separate poles, leads in six hours from Prijepolje. The town of Tašlidja, created by the refugees from Bosnia, lies on bare hill slopes, in which the Austrian soldiers have cut in white letters, twenty yards high, the initials of the Austrian emperor. Westwards a good carriage road leads to the Austrian frontier at Metalka. Here is stationed the most westerly outpost of the Ottoman power in Europe, and here is the boundary of the old Sandjak of Novi Bazar.

From Berani westwards the native populations are Slav. They all talk Serbian, or, as they call it, Bosnian. Bosnian, too, is the diplomatic language; for Turks and Austrians, in the absence of French, find their only means of communication in the Bosnian speech of their subjects. Commercially, the Sandjak is a road with no exit westwards. An impenetrable barrier of customs duties—the fruits of the Austrian occupation of Bosnia—stops all trade across the frontier. Tašlidja, two days' carriage drive from the Bosnian railway at Sarajevo, receives everything on pack-horses from Salonica, ten days' journey eastward. For the traveller the chief obstacle is that he is at once set down by the populace as an Austrian or a Russian. To their eyes there is no distinction of nationalities among foreigners.

Every stranger is an enemy, and has a secret political mission. Not long, for instance, after I had passed through Novi Bazar, an Italian friend of mine, coming from Albania to Mitrovica, wished to reach Novi Bazar. But he was not allowed to do so. Some consuls, he was told, had been there lately altering the frontiers, and the authorities at Novi Bazar had been obliged, in fear of the populace, to despatch them with a huge escort of cavalry, in the dead of night, over the Austrian frontier. Such was the version rumour gave of my own journey in the district.

Throughout the Sandjak I was under very great obligations to the Turkish officials. Their assistance rendered my journey possible; their great and unvarying kindness made it pleasant. The destiny of the Sandjak of Novi Bazar lies on the knees of the gods. One thing is certain: this key of the Balkan peninsula cannot retain its present form for long. The original Sandjak of Novi Bazar has seen many geographical changes; it will see more.

Albania.

I deal last with North Albania. It is the least-known and most interesting part of the Balkan peninsula. The people speak a language alleged to be more ancient than Greek. There are strange rumours of classical remains hidden in the mountain recesses. There is every element of romance to fascinate the traveller. Albania is a country of mountains. Near the sea-coast—to the south and west of Scutari, for instance—there are plains; but in the interior there are range after range of mountains, unexplored and unclimbed. Parallel with the eastern Montenegrin frontier, and twenty miles or so away, lie the many branches of the Prokletija, that is, the "Accursed Mountains." From Montenegro I obtained magnificent views of this chain. They resemble very much the Dolomites in structure and shape, while at sunset the rocks assume the most marvellous shades of pink and green. Their bare peaks are destitute of any verdure, and show no signs of human life. Even in August the snow still lies in patches on their slopes, though at no point did I observe any trace of a glacier. In this chain lies, in all probability, the loftiest mountain in Albania. There is, however, a rumour of a mountain further to the south, which is higher than any other. The question whether this peak is the highest is likely, however, to remain undecided, as those best acquainted with the country say there is no chance of the mountain ever being approached, as the tribes on its slopes refuse all access to strangers. On the north of the Prokletija rises the river Lim, which, after passing by Gusinje and Plava, crosses Montenegro and the Sandjak of Novi Bazar on its way to the Danube.

In a country like Northern Albania, where not seventy-five per cent. of the people die a natural death, there is not much opportunity for

commerce. In the plains near the sea-coast maize is grown, and Ipek has some reputation for its wine. The mountain tribes pasture their flocks and till the ground near their homes. In theory the land belongs to the Turkish Government, but, beyond a small payment on the beasts kept, they pay nothing in the way of taxes. There are few more warlike figures than the Albanian mountaineers. Their dress varies according to their tribe; but all invariably carry a rifle and wear a belt of cartridges, while the full-dress armoury consists, in addition, of two silver pistols and a curved sword, or yataghan, worn in the belt. The majority, whether Catholics or Mussulmans, shave their heads, except one lock of hair on the top, which they allow to grow long. Even in tending their sheep, or in sowing their fields, or in guiding their creaking tumbrils, drawn by bullocks and piled high with maize, no Albanian allows himself to be parted from his belt of cartridges.

I had long wanted to get to Gusinje, the large town already mentioned, situated in the middle of an amphitheatre of mountains belonging to the Prokletija group. Unfortunately, this particular part of the country was in a more than usually disturbed condition last year. The cause of this was a certain Mula Zeka, a person of whom it is difficult to obtain any definite information. I have talked to official Turks—civil and military—to Albanians and Montenegrins, and no two give the same account of this mysterious character. To some he was the Robin Hood of Albania. He did good to the poor; he had never harmed a single creature; he had even made roads where no roads were. To others he was the lowest type of a ruffianly brigand. One and all, however, agreed that Mula Zeka, an upstart plebeian of recent wealth and strong in the number of his family, that is, of his cousins and his uncles, could not brook the idea that he was not the equal or superior of a certain Bushara Bey, the head of an old aristocratic family, less prosperous now than once. Bushara Bey was on good terms with the Turkish authorities; Mula Zeka, consequently, was not. Last year the Government ordered Mula Zeka to appear at Ipek. This he declined to do; and when several governors and three battalions of soldiers were sent to Ipek to catch him, he went to Rugova. This place, probably the most inaccessible in the whole of Albania, is an isolated mountain; the only entrance is a narrow track in the rocks. It is inhabited by a tribe who have no communication with the outside world, nor allow the outside world to have communication with them. Having taken refuge here, Mula Zeka spent such leisure time as he had at his disposal, so I was told, in lying in wait for me with two hundred men, in the hope of diverting the attention of the Government from himself. I did not know this at the time, and therefore did not appreciate at its full worth the anxiety of the Turkish Governor of Berani, who knew how matters

stood, when we had left Berani for a day or two and gone eastwards along the frontier. He sent a zaptieh after us to tell us not to go near Rugova. The zaptieh got drunk, and, when he returned without delivering his message, the infuriated governor told him that, if the Franks did not return by sunset, on his head would fall the penalty. That evening, all unconscious of our part in the drama, we rode into Berani just as the sun was sinking, and the zaptieh was saved.

As far as Djakova the country was in a state of great excitement, and divided into two factions—for or against Mula Zeka. Gusinje was strongly in his favour, and no man of any of the neighbouring tribes had dared to go there all last summer. The moment was therefore most unpropitious for my chances of effecting an entrance, and I was in the end unsuccessful. But as my efforts to visit the place are so typical of the conditions and methods of travel in this part of the world, I may briefly allude to them here. The accident of a couple of Montenegrins being killed near the Gusinje frontier, and a consequent commission to inquire into the matter, gave me the opportunity of getting a letter conveyed to the Governor of Gusinje, telling him that I proposed to come to that town. This unhappy individual—who spends most of his time confined to the barracks, for the Gusinjotes will not let him out—answered me a month later that he would consult his chief at Ipek. A Montenegrin doctor at Andrijevica, who had once been summoned by the Gusinjotes, under a safe conduct, to see a patient in the place, had promised to do what he could for me. But my chief hope lay in a Turkish official of an old family from Plava, who undertook to take me into Plava and back again uninjured, even though I had killed fifty men of that town with my own hand. The Montenegrins were strongly against the attempt, but finally the Governor of the Vasojevići gave me a "bessa" or "pledge of safe conduct" in Serbian to the leading man in Plava, whose acquaintance he had made politically. This curious document, which, as I did not use it, I afterwards opened and read, was as follows. Of my friend who was with me and myself the governor said, "They are travelling over the world for their pleasure. They are my personal friends. Wherefore I recommend them to thee as my friend, that thou mayest receive and attend upon them well, and that they may be in safety. For I have told them that thou art a good and honourable man, and that with thee, as with me, they are in safety. Wherefore I yield them unto thy charge and the sure protection of thy covenant." Once in Plava—where report said were ruins of the old Roman town—I should be able to get on the two hours further to Gusinje. Every arrangement had been made. But at the last moment my Turkish officer was sent away on duty. With him vanished all my hopes of getting into Gusinje.

The division of the country into tribes, and the universality of the blood-feud, are the great obstacles to a traveller in Albania. But though

the blood-feud makes travelling difficult, yet without the blood-feud travelling would be impossible; for the system has some advantages. Treachery is unknown. The word of an Albanian may be implicitly trusted. If your deadliest enemy comes into your house, you must give him bread and salt: so long as he stays inside, he cannot be touched. All the details of the blood-feud are regulated by an unwritten code, called the law of Dukadjin, administered in each tribe by the chief and the old men. Of the provisions of this code, the following are instances: "If a man be killed while under the bessa, or pledge of safe conduct, of another, he who gave his bessa to the murdered man shall avenge his death." "If a man would be sure of his journey, it is enough that he be under a bessa, especially under the bessa of a chief or noble." Again, "If a man uses his arms against another and wounds him, but does not kill him, he shall pay a fine of £15 to the chiefs of his tribe. He who robs a traveller on the road shall pay £30 as a penalty; while he who steals beasts shall pay £5."

In connection with the blood-feud one of the most interesting and picturesque of recent events in Albania took place a few months ago, when there was a solemn reconciliation between the Albanians and Montenegrins at Vinicka, on the river Lim, near the Montenegrin frontier. The Montenegrins claimed 87 men killed and several wounded against the Albanians; the Albanians 104 dead and a smaller number wounded against Montenegro. The total of killed and wounded on each side exactly balanced. A battalion of Turkish soldiers and two battalions of Montenegrins met at the appointed spot. On the morning of the day the two armies were drawn up in lines facing each other, at right angles to and resting on the bank of the river Lim. The first part of the celebration was a religious service, in which both sides joined, conducted first by the Montenegrin popes, and then by the Mussulman hadji. Then the formal act of reconciliation began. The leaders of the Montenegrins and of the Albanians advanced, two by two, to the river's edge between the lines of soldiers, who presented arms. Each pair of men held one stone in their four hands, and each pair, on reaching the stream, flung the stone into the river, uttering, as it disappeared, the words, "As this stone is washed away and disappears, so let the blood-feuds between us be washed away and disappear." When the leaders of each side had successively performed this ceremony, the reconciliation was complete. By it the old scores were wiped out, and both sides could start afresh.

Such is the state of society in Albania. Its exploration is possible by conforming to the regulations of the blood-feud. Only thus will any stranger visit those unexplored regions of the Mirdita, of the Mat country or of the Dibra, and reduce the list of the geographical problems in Albania which still remain unsolved.

But now that I have described Montenegro, Novi Bazar, and

Albania, the question may well be asked, What interests have we in them? I acknowledge at once that our trade there is small, the possibilities of its development remote. But the Geographical Society, at any rate, is free from the curse of utilitarian notions. To make a country interesting and its knowledge desirable, it is enough that it should be unknown. But in this district the interest is more than purely theoretical. This meeting-place of East and West contains the key to the future political geography of the east of Europe. To know Montenegro, which, though tiny, has never yielded to the Ottoman power; to ascertain the political cohesion and the national sentiments of the peoples in the Sandjak of Novi Bazar; to discover the still unexplored resources of Albania, and the aspirations of its people, would do much to prevent any treatment of Eastern politics without reference to geography. For there are few parts of Europe where the changes in political geography have been greater, and the geographical knowledge of those who made the changes less. The vicissitudes of the Albano-Montenegrin frontier bear witness to this. The treaty of Berlin added to Montenegro the district of Gusinje, alien in feeling, in language, and in religion. Difficulties naturally arose. Ten years were taken up in settling them, and the frontier was at last drawn in accordance, not with the theories of politicians, but with the facts of geography. Geography asserted its ascendency; the Berlin treaty gave way. Gusinje was not handed over to Montenegro. Here, at any rate, the politician had not been what he should be—a geographer.

To remove this reproach from this part of the Balkan peninsula, we as Englishmen are particularly qualified. While we have not the obstacle of direct political interests, we have the advantage of the sympathetic friendship of the peoples, and I am convinced that, with time, knowledge, and tact, an Englishman can visit any of the yet unexplored districts of Montenegro and its Borderlands.

Before the reading of the paper, the Chairman, the Hon. GEORGE BRODRICK, said: I am sure we must all regret that our President is disabled by an attack of gout, happily not a very severe one, though enough to detain him at home, and I can assure you that, although I have taken the chair at his request, I feel very unworthy to occupy his place. Happily, my task is a very easy and congenial one: I have simply to introduce to you the gentleman who is going to address us presently, Mr. Cozens-Hardy, of New College, Oxford, who holds the geographical studentship of last year, which, as you know, is offered jointly by the Royal Geographical Society and the University of Oxford. Though geography does not hold quite the place I think it deserves in Oxford studies, I am not sure that it is generally known, at all events I have pleasure in mentioning, how large a number of our young tutors and undergraduates have travelled widely in their vacations and made good use of their opportunities. Of course, most of them have published nothing, but there are a few, like Mr. Tozer and Mr. Hogarth, who have done good work for geography, if not in discovering unknown countries, at all events in bringing the light of modern

scholarship and science to bear on countries already known, but never before really explored. In this little group I think we may predict that Mr. Cozens-Hardy will hold a foremost place, and I am sure that I need not bespeak for him an attentive hearing for the address he is about to deliver to us.

After the reading of the paper, the following discussion took place:—

Colonel M. T. Sale: I have very little to add to the remarks made by the reader of the paper. One point which occurs to me as the most striking feature is the extraordinary difficulty which the whole country presents to a military occupation. It was always a puzzle to me, at any rate until I saw the country, how it was they managed for so many years to resist the Turkish forces; but after seeing the country wonder existed no longer. It was the most confused mass of serrated limestone rocks which it is possible to imagine, destitute of roads, and completely devoid of means of sustenance for an organized army. Now, however, a road has been made, and it is an open question whether that road may not prove disastrous to Montenegro in the future. Another point is the scenery of a part of the eastern frontier; I do not think the reader of the paper spoke of that, or of the Zem river on the eastern frontier. Looking from the country marked as Medun and Rikavac, one sees the most appalling precipice, while the Proklitija mountains are a most extraordinary group; I have seen nothing so striking in mountain scenery. Lake Scutari is another interesting point, for only in comparatively recent years has it been subject to flood. When I approached it in the height of the inundations, the whole of the bazaar and custom-house of Scutari were under water, and we had to approach through the streets on the far side to get at it. This is caused by the inflow of the Drin river draining a considerable valley subject to torrential floods, which have gradually raised the bed of the river by deposits, that headed back the waters of the Bojana river, so that the outlet of the lake is closed. On the coast the marshes are greatly prejudicial to the development of the country; but for beauty of scenery it is almost unequalled, the contour of the mountains being striking to a degree.

The Hon. T. W. Legh, M.P.: My knowledge of Montenegro and the adjacent countries is of a mere superficial character, and I am unable to add much to the stock of information of the scientific body I have the honour of addressing; but, superficial though my knowledge may be, it is sufficient to enable me to appreciate the journey so ably and yet so modestly described to-night. The journey is remarkable for several reasons. In the first place, it was more or less hazardous, because no part of Europe is more inaccessible in a certain sense, and more insecure as regards life and property, than Albania; it is no man's land, where every man considers every other man his natural enemy. Mr. Cozens-Hardy has shown remarkable diplomatic ability, because every one is looked upon with extreme suspicion by the Montenegrins, and he has achieved a most remarkable feat in that he has done what six great European Powers attempted in vain—ascertained and defined the correct frontier of Montenegro and Albania. He has truly remarked that Montenegro is inaccessible and rarely visited; for the ordinary tourists it presents few attractions, and yet considerable interest attaches to it. It is the one state in the Balkan Peninsula that has remained free ever since and during the whole period of the Turkish invasion, and from a political point of view it is the only place in Europe, so far as I am aware, where paternal despotism may be observed in full working order; where the hereditary sovereign is his own chancellor, prime minister, and commander-in-chief; in the morning administering justice under a tree, later reviewing his army, still later engaged on a commercial treaty with a foreign power. He is an able man; I cannot conceive of any one better fitted to play the part which he plays so successfully. He has added largely to the territory of his country, and that is a

proof of the strength of his character. He in his own country preserves perfect order; robbery is unknown; your life and possessions are perfectly safe; you may go where you like. The Montenegrin shows little aptitude for anything except fighting.

Mr. J. A. R. Munro: I will add very few words to what has been said by Mr. Cozens-Hardy, who has pointed out how interesting a country Montenegro is, and what a fine race physically the people are. Possibly some here to-night may be induced some day to visit Montenegro; they will find plenty to interest them, and, if they keep their eyes open, may find historical remains. For instance, within a range of five miles it is possible to find a Roman town, an Illyrian fort, and several Christian churches of the sixth century. I bought near an old fort several coins of Scutari not to be found in the British Museum; no less than seventy inscriptions were found where we were digging. It would be difficult to find anywhere a Roman town just as it was left at the time of Justinian, as we found it. Dukle marks a stage in the Romanizing of Illyria. The cities of the coast derived their rights from the time of Augustus; Dukle and the central valley were enfranchised by the Flavian emperors; towns further inland had to wait until the time of Hadrian and the Antonines. Another point of interest that came up during the excavations was the strong hold Italian and Latin civilization had upon the province of Illyria. It was thoroughly Latin, and not Greek; and the organization and the forms of the churches, the architecture, and ornamentation point to the West, and not to the East. The history of Illyria from the seventh to the twelfth centuries is almost blank, and new light thrown upon it by inscriptions or anything else will be valuable. I hope any one making a visit to the country will look out for such things.

The Chairman: At this hour it ill becomes me to offer any remarks of my own, and I shall confine myself to expressing, as I may do on your behalf, your hearty thanks to Mr. Cozens-Hardy for the very interesting and instructive discourse we have heard this evening on a part of Europe that may be considered almost its darkest corner. I was a little afraid when Mr. Legh was speaking, as he did in so interesting a way, that we might transgress the bounds of geography and get into the region of politics; but in that respect Mr. Cozens-Hardy gave us a good example. He had a good word both for the Montenegrins and for the Turks, whom of late we have been used to hear denounced in no very measured terms. However, I think we shall agree that an address such as we have heard from Mr. Cozens-Hardy is of real geographical interest. As our maps get filled up, the progress of geography will probably depend more and more on careful and detailed studies of limited districts such as Mr. Cozens-Hardy has made, and I only hope that future explorers who represent us will be as thorough-going and conscientious as Mr. Cozens-Hardy has proved to be.

Mr. Cozens-Hardy's Map.—This is a sketch-map based on P. A. Rovinsky's map of Montenegro, with additions, and corrections as regards the boundaries, by Mr. W. H. Cozens-Hardy. The hill work has been filled in from other sources.

CONTRIBUTIONS TO THE PHYSICAL GEOGRAPHY OF BRITISH EAST AFRICA.*

By J. W. GREGORY, D.Sc., F.G.S., of the British Museum (Nat. Hist.).

IX. The Plateau of Laikipia, and its Volcanoes.

The most important of the plateaux that border the rift-valley, both in area and from the evidence it is likely to afford as to the geological structure of the country, is that of Laikipia. This is a vast extent of undulating steppe varying from about approximately 6000 to 7000 feet in height, and occupying an oval area of about 5300 square miles.

It is bounded on the south by the forests of Ukikúyu; on the east by Kenya, the gneiss ranges of Doenyo lol Deika, and the Loroghi mountains. Its western limits are formed by Settima and the east wall of the rift-valley from east of Naivasha to Lersubugo east of Baringo, and the precipices of the lava-capped plateau of Morongóp; upon this side the foothills east of Njemps, Rangatan Busi, and Kinangop are also to be included within it. The northern end is the least known, but here it seems to taper off between the eastward curve of the rift-valley by the Sukut steppes, and the westward bend of the Loroghi mountains.

Laikipia has been very seldom visited. The indefatigable Arab and Suahili traders have found their way across it; thus Ferhagi of Pangani traversed it from Naivasha to Ndoro, and also from the former northward to Marabit.†

Only three European expeditions had previously set foot upon it, and these were all-powerful both in numbers and equipment. Thomson crossed it with the Society's expedition as far as the Guaso Nyiro in 1883, but he was there compelled to escape to Njemps under cover of night. Teleki and Höhnel traversed Laikipia in 1887, from south-east to north-west along the line of the main Suahili caravan route, along which they were guided by the famous Jumbo Kinameta; this was a little to the south of Thomson's line; Dr. Peters, with the German

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* Paper partly read at the Royal Geographical Society, January 15, 1894. Map, p. 384. Continued from the October number. A remark in the first part of this paper (*ante*, p. 290), to the effect that our knowledge of the African part of the rift-valley is mainly based on the study of specimens brought home by various travellers, may be taken to reflect unfavourably on Mr. Joseph Thomson's two geological maps. Nothing was further from my intentions. The paragraph in which the passage occurs, refers to the objects in my joining the expedition to which I was attached, and the remark was intended to apply to the area which that expedition hoped to explore, and which seemed to offer the greatest facilities for determining the age of the rift-valley. Full references to the works of others on the geology of East Africa, in which those of Mr. Thomson take a leading place, are given in a paper which I hope to submit shortly to the Geological Society. I did not, therefore, think it necessary to repeat them here.

† Denhardt, *Pet. Mitt.*, xxvii. p. 138.

Emin Pasha Relief Expedition, followed much the same course in December and January, 1888–89.

My own route lay to the south and west of any of these, as from the first we left the former routes well to the left. We thus passed the south end of Höhnel's "Marmanett Berge," and across the site of his "Angata Bus," to the valley between his Gojito Berg and the "Aberdare Kette." It was not till we were south of the latitude of Ndoro that we bent our steps more directly to the east.

Laikipia consists in the main of a vast lava plateau, the rocks of which are of some antiquity; though the basalt sheets at the north end of the plateau are younger than the trachytes and andesites that cover the largest proportion of the surface. The whole plateau belongs to an area of internal drainage, as the Nyiro and its numerous tributaries, the G. Narok, Laschau, Nairotia, Ngare Songoroi, Guaso Rangatan Nado, are finally lost in the Lorian swamp (see p. 28), while the rivers of the western foothills enter the lakes of the rift-valley.

Fig. 4.—Longonot looking west from the summit of the Col to the E.

Laikipia may be divided into four main districts—the western foothills, the northern lava plain, the Ndoro basin, and the Settima plateau, which may be considered in this order.

At the point where most travellers descend into the rift-valley, the Kikuyu fault-scarp is almost an unbroken cliff of 800 feet in height; at about 300 feet above the floor there is a narrow terrace, but this disappears both to the south and north. On the other side of the Longonót pass, the platform reappears and soon becomes of considerable width. Thus at Naivasha the Kikúyu fault-scarp is replaced by two. The first forms a long low cliff of lava facing the west, with a vertical face usually about 40 feet in height. Above this is the great grazing land known as Kinangop. I, therefore, for this cliff adopt the appropriate name of the Kinangop fault-scarp, which was given to it by Mr. E. Gedge, though he of course called it an "escarpment." On the east side of Kinangop is the more imposing fault-scarp which forms the western limit of Laikipia, and is part of the great "Laikipia fault-scarp."

The Kinangop plateau extends to the north across the valley of the

Malewa (Murentat), and along that of the Gilgil or Naitolea to the great grazing plain known as Rangatan Busi.* Here the two fault-scarps reunite, and there is but one main scarp from Kekupe and the mountains east of Elmetaita to the north end of Lake Losuguta (Hannington). At this point, however, there appears a complex series of foothills and step plateaux between the low scarps east of Njemps and the great vertical cliff-face of Doenyo Nelesha.

Further, again, to the north beyond Baringo another line of elevation traverses the rift-valley, and has the effect of uniting the various fault-scarps into the west face of the basalt-capped plateau of Morongop.

As the foothills east of Njemps are topographically somewhat complex, and geologically of great interest, it may be advisable to examine them more in detail.

A short distance to the east-south-east of Njemps Ndogo is the first outlier from the foothills, which here consists of a ridge running from north-north-east to south-south-west. It is split into three by some faults of which the scarps face the west, while a grass-covered slope leads down to a bay alluvium which runs from the Njemps plain southward into the hills. To the south the ridge rises and broadens so that it joins the main series of foothills. The name of this thrice-faulted ridge is Lolbobo, and the bay of alluvium which it forms is known as Summuran. The high hill to the south end of the bay which connects Lolbobo and the main series is known as Doenyo Ngusagari, and the stream which flows down the bay bears the same name.

The main foothills in this district may be called after Larabwal; this is a plain at the foot of the steep fault-scarps of Nalesha and Doenyo lol Mwari, and bounded on the west by a series of ridges and rounded summits. The entrance to the district from the plain of Njemps lies at first along the gorge of a river, which was dry when we entered it. This is followed to the east-south-east for about a quarter of a mile, until it bends sharply to the south just before its course is broken by some falls. A stiff climb up the north wall of the gorge over some nodular altered andesites leads to a dry valley rising to the north-north-east. The route then bends round the north foot of the hill which forms the east side of the valley, and then to the south and south-south-east till it reaches the opening of the Larabwal pass. A very steep sinuous game

* The correct spelling of this name is very doubtful. Thomson (*op. cit.*, p. 209, and Index, p. 361) calls it Angata Bus, which he appears to interpret as "Treeless Plain." Mr. Ravenstein calls it Angata Bush, or "Ash-grey Plain." Denhardt calls it Rangatan Wus, and says the latter word means "a cloud," a very probable explanation (*Pet. Mitt.*, Bd. xxvii. p. 138). I always, however, heard it called Rangatan Busi, or "the place of goats;" this must be compared with Rangatan Ndari on the other side of Settima, which means "place of sheep." If this is the true etymology, then the name is due to the Suahili traders, though it is now adopted by the local natives. *Daren* and *gera* are the Masai respectively for "goats" and "sheep."

track leads over a series of lava crags to the summit at the height of 4430 feet. From the summit and during the ascent we obtained fine views of Baringo and the opposite hills of Kamasia. After crossing a second col the pass opens out to the Gopo (or "district") Larabwal. This is a fair level plain 10 miles long and 5 broad. It is somewhat oval in shape, tapering at either end to a gorge that at the upper end is the channel of the Guaso el Narua; at the north end of Larabwal is a swamp, from which a river flows through a gorge toward Baringo. This may be Thomson's Guaso "Teen," which in its lower course he calls the Guaso Boli.

The west side is formed of a steep scarp, which is divided by the gorge which Teleki descended. The part to the north is called the Doenyo Neleshá, and that to the south the Doenyo lol Mwari. On the west side there are a series of hills somewhat irregularly distributed, and forming a striking contrast to the straight cliff on the opposite side. Larabwal is not quite level, as some fault-ridges occur upon its floor and divide it into two; the western half is known as Njoro (or Lanjoro, *i.e.* "spring") Larabwal, and the eastern is that of the Guaso el Narua.

The northern lava plateau has not yet been visited by Europeans, though it has been crossed by Ferhagi of Pangani. Höhnel saw it during his return from his excursion to the Guaso Nyiro;* he describes it as an undulating, steppe-like plateau, with a number of steep but flat-topped hummocks. I had occasional views of it from the Marmanett Berge, while I was able to obtain a better idea of its geological structure from its western outliers, such as Morongop, north-east of Baringo. It is limited to the north by the western bend of the gneiss ridges of the Loroghi mountains and the eastern bend of the rift-valley.

The Ndoro Basin may also be summarily dismissed. It is a level plain of an approximate mean altitude of 6300 feet. It is bounded on the north by the great northern lava plain forming the left bank of the valley of the Guaso Narok; on the west and south-west it ends at the foot of the mountains of Settima and Sabugu la Poron (the Marmanett Berge of Von Höhnel). Its limits on the east are Kenya, Doenyo lol Deika, and the district of Gadormurtu. The country consists in the main of level grassy steppes, with occasional conical volcanic hummocks and lava crags. It is traversed by numerous rivers, of which the chief are Nyuri or Nyiro, Laschau, Nairotia, and Narok, which all unite and flow eastward into Lorian swamp. Numerous papyrus swamps occur along some of these. The name Ndoro is used by the Masai for the highest southern end of this area, and is sometimes restricted to some kraals at the west foot of Kenya; these had been abandoned a short time before my visit. This is the highest part of the basin, and forms the watershed between the Nyuri and the Tana.

* 'Zur Rudolf-See,' p. 463.

The Settima Plateau is a higher district than the Ndoro basin, and its mean altitude is approximately 6700 feet. It occurs round the eastern foot of the great volcanic pile of Settima, and separates this from the Ndoro division of Laikipia. It occupies the site marked on Von Höhnel's map as the Aberdare Kette, the southern end of which he calls Settima Kette. It is, however, certainly not to be regarded as a mountain chain, as it consists of an undulating plateau intersected by numerous rivers, which cross it at right angles to the supposed mountain axis. The only peak-like elevations upon it are an irregularly distributed series of small volcanic bosses.

The rivers that I crossed during my traverse of the district are the following, going from north-west to south-east:—

1. The Guaso Narok, or "Black river." This is said to rise in a swamp called Kope Kope, and in its upper course it is named by Thomson and Von Köhnel the Guaso Ururi; the former writer gives it a prolonged extension to the south. Von Höhnel, however, correctly cuts it short. I crossed it near its head, but it was only known to my guide and some neighbouring Wanderobbo as the G. Narok. The name Ururi is probably a result of confusion with the Nyuri. The river where I crossed it varies from 10 to 30 feet in width, and from 1 to 2 feet in depth; this ford was at the altitude of 6450 feet. I could get no information about the "Thomson Falls," and, judging from Mr. Thomson's description of them, they must be considerably lower down the river.

2. Guaso Laschau. This was represented by two branches, which we crossed at the altitudes of 6740 and 6710 feet. They flowed through narrow valleys in the lava plateau. The name was first reported by Höhnel; it must be the same river as that which Thomson calls the Kadede.

3. Ngare Songoroi (Höhnel), or N. Pes (Thomson). This rises in a swamp at the altitude of 6610 feet. We crossed this at its western end, and there found some small black specimens of *Telphusa*, which Prof. Jeffrey Bell has determined as an Egyptian species (*T. berardi, M. Ed.*).

4. The two branches of the Guaso Rangatan Ndare must unite with the last-mentioned stream before the ford where Teleki and Höhnel crossed it, as they do not appear in the latter's map.

5. Guaso Nairotia. Höhnel indicates four streams uniting to form this river. On the Settima plateau it consists of two branches, each about 18 inches deep and 40 feet wide. They both flow through deep channels; that of the northern branch has formed in places a regular cañon.

6. Guaso Rangatan Nado. This also consists of two small streams, which we crossed at the altitude of 6780 feet near the Guaso Nairotia.

7. Guaso Nyuri. Of this six branches were crossed, the names of which are the Guaso Narol Gwinia, the Ngare Kurésh, the Guaso Nyiro (two branches), the Ngare Moitian, and the Guaso Barakari. Where

Höhnel and Thomson crossed it they are reduced to three. This river receives the drainage of the northern slope of the Kikuyu uplands.

The Hummocks on and at the base of the Settima Plateau.—Scattered over this section of Laikipia is a considerable number of small bosses of lava (basalts and andesites). They are generally low, ranging from less than 100 to 200 or 300 feet in height. A few occur at the base of the plateau on the level steppes of the Ndoro basin, and these may be included topographically, as they must be geologically, with the others. These hummocks are most numerous near the upper Guaso Nairotia. The following are the names of the principal members of this series: Doenyo Mesia, Lubule, Gethuri, Lasho, and Narol Gwinia.

Kenya.—On the east side of the Leikipia plateau rises the greatest, and once, if not still, the highest of African mountains. It owes the name by which it is known in Europe to a mistake of its discoverer, who applied to it the word which his Wakamba guides must have meant for the whole of the upland country from which the mountain rises. The only name which Mr. J. Ainsworth, the Superintendent of the British East Africa Company's station at Machakos, has been able to obtain from the northern Wakamba is Njálo, which they also use for Kilima Njáro; Njáro is probably only the Kikamba, and Njáro the Kisuahili form of the same word. The mountain, moreover, is not in Ukambáni, but in Ukikúyu, and the Kikúyu name for it is Kilinyága; this ought, therefore, to be adopted according to the strict rules of geographical nomenclature, but, as Kenya is now so well known in Europe, an exception may well be made in its favour. The ordinary spelling is, however, very incorrect, as, according to it, the name should be pronounced Ke-nī-a.

Among other synonyms are Meru, which is used by the Zanzibaris; Doenyo Ebor, or "White Mountain" (not "Black Mountain," as the translator of Von Höhnel's 'Discovery of Lakes Rudolf and Stephanie' says in a footnote in vol. i. p. 364); or Doenyo Egeri, or "Spotted Mountain," as it is called by the Masai.

Kenya covers a considerably larger area than Kilima Njáro, but the latter is better known, owing to its proximity to the coast, and, in fact, it is occasionally seen from the sea. Kenya is also much older than Kibo, the higher of the two peaks of Kilima Njáro, and corresponds to the same period in the volcanic history of the country as the old eroded cone of Mawenzi.

Kenya was first seen by a European in December, 1843, when Krapf saw it from Kutui in Ukambáni.* It has been subsequently seen by Europeans on the way to Uganda, and by Thomson and Peters, who passed near its west foot on their march across Laikipia. It had twice been previously visited by exploring expeditions, but the only European

* Krapf, J. Lewis, 'Travels, Researches . . . in Eastern Africa,' 1860, p. 442.

who had ascended above the forest zone was Count Teleki, in 1889, as the members of the British East Africa Company's expedition had to turn back at the height of 8700 feet.*

The mountain may be conveniently divided into three parts: (1) the forest zone, with a long and very gentle gradient, covered by dense jungle and forest; (2) the zone of Alpine pasturages in which the slopes are steeper, rock exposures and crags numerous, and which is cut up by deep valleys into a complex series of ridges; and (3) the central core.

The *forest zone* is characterized by its gentle gradient, and by the denseness of its forest and jungle, in which the most striking feature is the thick belt of huge bamboos. On the west side this zone extends down to the Leikipia plateau, into which it passes somewhat abruptly at the height of about 7300 feet. As this is the line of the east and west watershed across Laikipia separating the basins of the Tana and the Guaso Nyiro, the forest zone does not descend so low as on other parts of the mountain. From the steppes at Ndoro the forests can be seen to descend both to north and south; as the eastern face of the mountain rises from a lower level, it is probable that they are also lower on this side.

The ascent through the forests is very trying. The trailing plants that cross from the summits of the lofty junipers and *Podocarpus*, and the branching of the bamboos, combine to form a canopy that makes it below dark and damp. At every blow of the mattocks with which we cut our way through the jungle, the sodden bamboos poured shower-baths upon us, while our feet and legs were kept wet and cold by the dense undergrowth of shrubs, ferns, and *Selaginella*, and the swamps and pools through which we had to wade. The three days' work in this zone told heavily upon the men. Owing to the cold and the mist we could not start before eight o'clock, and every hour we had to light fires to warm the porters, as they would otherwise have been too cold and numbed to proceed. On the morning of the fourth day we emerged, to our intense relief, into the sunshine of the high Alpine pasturages.

The *Alpine zone* is fairly well defined below at the level of 10,200 feet; but its upper boundary is less definite, as in damp sheltered valleys the pasturages run a good distance above the normal height of 15,000 feet. The slopes here are much steeper than in the forests. Rock exposures are numerous in the form of crags and pillars of agglomerate upon the ridges, and as bosses on the face of iceworn slopes. Ordinary trees are absent except for a few on the edge of the forests, and the only ones present are a new arborescent groundsel allied to the extraordinary *Senecio Johnstoni*, and some woody giant lobelias (*Lobelia Telekii* and *Lobelia gregoriana*); these, however, are

* Gedge, Ernest, "A Recent Exploration under Capt. F. G. Dundas, R.N., up the River Tana to Mount Kenia," *Proceedings* R.G.S., new ser. vol. xiv. 1892, pp. 527–528.

abundant, and supply sufficient firewood. This part of the mountain is cut up by numerous deep valleys, the walls of which give abundant evidence of former glacial action. The Alpine zone may be divided into two subzones, which are well characterized by the difference in the flora (see *post*, p. 68); the lower one consists mainly of a sharp wall of rock some 700 feet in height, which, from the plains below, I had mistaken for the walls of a crater, but which really is the slope of the icefall of the great sheet glacier that once covered the mountain. The upper subzone is that of the deep valleys, the ridges between which are often the beginning of the crests that pass up into the arêtes of the final peak. It is in these valleys that the arborescent *Senecio keniense* is abundant, in some places forming regular groves. Here also lives a small rodent, which my colleague, Mr. Oldfield Thomas, has identified as *Otomys irroratus*, while I picked up a skull of *Hyrax*, and noticed the footprints of elephants, probably about two months old.

According to Count Teleki, the walls of the original crater are still preserved. Lieut. von Höhnel, on his authority, tells us* that the crater is from 4 to 4½ kilometres in diameter, that it is circular, and from 200 to 300 metres deep, and finally that it is full of snow and ice. If such were the case, the outer slope of the crater ought to be in this upper Alpine zone. The ridges between the valleys are formed in the main of volcanic ejectamenta, such as ash and agglomerates with numerous intrusive dykes. It is obvious, therefore, that this is the site of the old crater wall, but it is now so eroded that no trace of the actual rim remains.

The Central Core.—The final peak of Kenya consists of five or more steep pyramids which rise from the snow-fields and glaciers at their base. Teleki states (von Höhnel, *op. cit.*) that the peak is one of the projections on the wall of the crater, but its geological structure forbids this hypothesis. It is really, as Mr. Joseph Thomson† recognized by a distant view, the central core of a very denuded old volcano.

The five pyramids that may be seen on the south and west sides are as follows: (1) and (2) the double central peak; (3) a sharp peak on the western arête, the height of which is about 17,500 feet, and which I propose to name Point Piggott, after the Acting Administrator of the Imperial British East Africa Company; (4) and (5), on the south side, are two aiguille-like peaks, separating the Lewis and the Tyndall glaciers, above which they tower with bare cliffs of excessive steepness.

As is usual with the cores of old volcanoes, the whole of the central peak is extremely rugged and difficult, and presents on all sides a

* Von Höhnel, 'Orographisch-hydrographische Skizze des Forschungsgezietes der Graf S. Teleki-schen Expedition,' 1887, 1888. *Denk. Akad. Wiss. Wien.*, Bd. lviii. (1891), 1892, p. 457.

† Thomson, Joseph, 'Through Masailand,' edit. 1887, p. 224.

forbidding array of bare precipices and slopes, which are usually at too high an angle for much snow to rest upon them.

In attempting a brief sketch of the main features of the mountain, it may be convenient to treat the subject under the following divisions: (1) the ridges; (2) the valleys and rivers; (3) the lakes; (4) the glaciers; and (5) the former extension of the glaciers.

The Ridges have in the main a radial direction from the central core, but especially in the upper Alpine zone their arrangement is somewhat complex.

In the first place, to take those of the central peak, I only saw four of the main arêtes sufficiently closely to be able to say anything about them. One of the largest runs off to the east-south-east, and is continued as the north wall of the Hobley valley. It rises fairly steeply from the curve of the valley at the east end, and then runs for a couple of miles with only a slight rise, but with many rough crags and aiguilles upon its crest; then, bending more to the east, it passes abruptly into the eastern arête. The southern arête is at first sight the most promising from a mountaineering point of view, for though there are numerous cliffs along it, there seems more hope of turning these. It crosses the upper end of the névé field of the Lewis glacier, and a series of hot plates rising through it, show that the ridge is not there very deeply buried; the steep eastern face is here corniced. South of the glacier there is a small col 16,600 feet in height, beyond which a branch of the crest runs off to the south-east as the south wall of the Hobley valley, while the main ridge rises to the south to the twin Lewis peaks. At the southern of these it divides, and a branch runs to the north-west to the north Teleki peak. This latter is one of two peaks on the crest which I have named the Teleki ridge, as it overhangs the end of a valley, which, for reasons subsequently stated, I propose to name after this explorer.

The next main arête is the south-western, and it is really double. It is excessively steep and broken, while the snow-fields on either side cross it at intervals. This arête sinks below the most northern of the three main glaciers; the double ridge that forms the north wall of the upper part of the Teleki valley may represent its western continuation.

The west arête is not so steep as the last; it is broken by the great Point Piggott, and a series of vertical cliffs.

The ridges that traverse the upper Alpine zone in this part of the mountain often appear to be quite independent of the higher arêtes. A considerable number radiate from Mount Höhnel, the principal secondary peak not belonging to the central group. One goes to the east to join the Teleki ridge; another to the north-east forms the west wall of the cirque in which nestles the upper tarn of the Teleki valley; one to the west-north-west with the "Phonolite crags" is the south wall of the Teleki valley, another to the west-south-west forms the south wall of the Höhnel valley; and a fifth goes to the south, but, after sending off

several branches to the south and south-east, bends round to the south-west as the left wall of the upper valley of the Guaso Mairi.

To the north of the Teleki valley there are four main ridges, all of which trend to the west-north-west; the southernmost of the four is forked at its upper end, and encloses a snow-filled hollow. From the eastern extremity of this ridge a short one branches to the north-north-west; this compels the stream that runs from the northern of the two tarns upon the col below Point Piggott to make a long détour to the north, before it is able to enter one of the west-north-west valleys. The valley through which it then flows I am glad to name after Mr. Joseph Thomson, whose keenness and topographical insight I have often had occasion to admire.

The Valleys.—The two main valleys in the south and west sides of Kenya are those which strike from the foot of the central peak to the south-east and south-west respectively. The former is the broader and longer, and stretches from the base of the peak at the angle between the east and south arêtes in a great bow curve to the south-east. As this is probably the valley that would have been struck by the Kenya expedition of the British East Africa Company, I propose to name it the Hobley valley after the geologist and cartographer with that party. It is bounded to the north and east by the east arête, and by a long crag and aiguille-covered ridge that continues this to the south-east. The other side consists of the south arête, which faces the east with a cliff of great height, which is in places fringed by an ice cornice formed of snow swept up by the wind from the glacier on the west slope of the arête. To the south of the col above the Lewis glacier the crest divides into two ridges, one of which bends to the east and includes a peak of about 15,600 feet in height before it is lost to view as it curves round behind the sky-line of the left side of the valley. The west side of the Hobley valley is so steep that very little snow rests upon it; the stream in the valley receives its main supply from the more gradual eastern slope, the upper part of which bears a good deal of snow.

The principal valley on the west side of Kenya is that by which Count Teleki ascended, and in which he reached his highest point. I therefore propose to name it the Teleki valley, and to apply the same name to the ridge at its head and the lakes upon its floor. The valley receives the drainage of the three main glaciers. It is the largest of the streams, and is entitled to be regarded as the head stream of the Guaso el Nairobi, and therefore as the actual source of the Tana. The main course of the valley runs east and west; but it curves gently northward at its lower end, while it is bent sharply in the same direction by the Teleki ridge at the upper end. A branch from the south-east here joins it, and in this is the larger Upper Teleki tarn. This arm of the valley drains the hollow between Mount Höhnel and the Teleki ridge. The gradient in the branch of the valley that here comes

from the north is much steeper, and the stream falls as a noisy torrent over the crags that formed an icefall in the glacier that once flowed down the valley. Above the old icefall the valley forks again, one branch continuing northward to the two northern glaciers, and the other bending eastward to the snout of the Lewis glacier.

South of the Teleki valley is a parallel valley, which, with the mountain and lake at its head, I beg to name after Lieut. Ludwig von Höhnel, Count Teleki's able colleague, whose maps are among the finest in the literature of East African geography. The valley begins as a cirque cut in the layers of lava and ash of Mount Höhnel. It descends rapidly as a deep narrow valley through the agglomerates and volcanic ejectamenta of this part of the mountain. It emerges at the foot of the great icefall cliffs, and subsequently no doubt joins the Guaso el Nairobi in the upper forest zone. The most interesting side valley from this is that which joins it from the north, just opposite the agglomerate crags, under the shelter of which one of my camps was pitched. From the character of the rock at its head, I have called this the Phonolite Cwm.

South of the Höhnel valley there is another, which rises due south of Mount Höhnel, and, soon bending to the west, receives a branch produced by the forking of the ridge that starts from the south end of Mount Höhnel, to form the south side of the Höhnel valley. This side valley is occupied by an extensive swamp, the waters from which join the main stream, and they together give rise to the Guaso Mairi.

North of the Teleki valley, there are at least three other valleys. The first commences at the col with the two tarns, and flows west-north-west, ultimately bending more to the northward, till it emerges at the foot of the icefall. The stream which discharges through it apparently bends south, and joins the Guaso Nairobi. The next valley, which I have named after Mr. Joseph Thomson, is important, as I believe it does not belong to the Tana watershed. It descends at first to the north-north-west for about half a mile, and then turns west-north-west. This stream probably flows north into the Guaso Nyiro.

The Lakes.—Count Teleki has recorded the existence of one lake on Kenya, but I was prepared to find a considerable number when I saw how extensively the mountain had been glaciated. They occur in hollows and rock basins in the agglomerates and ashes, and are, doubtless, mainly fed by springs in their beds. They act as reservoirs, and from them rise many of the streams that drain the west and south slope of the mountain. The largest lake is that which I propose to name after Lieut. von Höhnel. It is situated in a fine cirque in the cliffs of Mount Höhnel. The lake is about 600 yards long and 400 wide, the greater length being north and south, and is situated at an altitude of 13,980 feet. It is fairly oval in shape, but the east side is irregular, owing to the ingrowth of alluvium. It is no doubt glacial in origin, as it is in a

rock basin, which is deepest at its upper end, and is supported on the west by a rock barrier, which is extensively *moutonnée*, and bears numerous large erratics. It receives the drainage of five feeble brooks, and discharges its surplus waters by a stream which issues from its north end, and flows by the Höhnel valley into the Guaso Nairobi.

In the Teleki valley to the north of this, there are two more lakelets, the lower of which was that seen by Count Teleki; it is a small tarn on the floor of the valley above the uppermost of the three moraines that project halfway across it. The upper and larger of the two Teleki tarns occurs in a branch from this valley at the north foot of Mount Höhnel and below the steep talus-strewn slopes of the Teleki ridge. The latter tarn is circular, and the former somewhat pear-shaped. Both have outlets to the stream which flows down the valley from the glaciers.

Two more tarns occur on the summit of the col that leads from the upper Teleki to the Thomson valley. They occupy rock basins, and one drains to each of the two valleys mentioned. They are not connected, as a *moutonnée* ridge bearing erratics occurs between them. Both lakelets are irregular in shape, and the three glaciated bosses of rock rise above the surface of the northern tarn.

The Hobley valley has also two small lakes which lie in the main course of the stream. I have pleasure in naming them the Bird-Thompson tarns, after the caravan leader and interpreter in the British East Africa Company's expedition.

The Glaciers.—It has long been known that the summit of Kenya was covered with a certain amount of snow, but owing to the steepness of the peak this seemed to be very limited in amount, for the descriptions of those travellers who had seen the mountain in the distance showed that the Masai name of Doenyo Egére ("the Spotted Mountain") was very appropriate. There appeared to be nothing on the mountain comparable to the great cap of snow and ice that covers the summit and fills up the crater of Kibo, the highest peak of Kilima Njaro; Count Teleki, moreover, described the snow as occurring only in the crater.

One of the main objects of my visit to the mountain was to determine whether there were any true glaciers with moraines and crevasses upon the mountain, and especially if there were any evidence of their former greater extension.

The glaciers which I saw are all grouped on the south-west side of the central core. There are three principal glaciers of the ordinary type; for the largest of these I propose the name of the Lewis glacier as a slight tribute of respect to the memory of the late Professor Carvell Lewis, whose untimely death stopped a work that has had a considerable, and which seems destined to have an even greater, influence upon the study of former glaciations. The glacier rises from a névé field which occupies the area between the base of the larger pyramid and the edge of the south arête, and fills up some hollows near the summit of the crest.

The névé field has a fairly gentle slope down to a small icefall, where the glacier is very much broken up by a series of snow-covered crevasses, through the gaps of which there appears the exquisite crevasse blue. Below this, the glacier narrows and ends off with a rotten snout at the height of 15,500 feet.

On the right bank, the glacier flows close below the base of the vertical cliffs of the two aiguilles; its left bank is formed in the main by a line of loose lateral moraine. The snout is surrounded by a set of several terminal moraines, the last of which has been broken through by the readvance of the glacier. The surface is remarkably free from *débris*, but the height and composition of the left lateral moraine shows that this has not always been the case.

To the north of the Lewis glacier occurs another, the base only of which did I succeed in visiting. This glacier is smaller than the other, but much steeper. It occurs in the hollow between the two aiguilles and the south-west arête. The bulk of its material is apparently derived from falls from the corrie and hanging glaciers upon the face of the peak, and from a large couloir that runs up to the south arête. I propose for this the name of the Tyndal glacier, after the man to whom is due most of our knowledge of glacial physics.

The third main glacier drains a névé field to the north of the south-west arête, and extending thence along the base of the west arête and the south face of Point Piggott. It extends down to the level of 15,300 feet. Its lower right bank is formed by a lateral moraine; the level of the ice on the left side is raised by falls of ice from the two corrie glaciers which cling to the cliffs above. I propose to name these the Heim and the Forel glaciers after the two Swiss geologists who have added so much to our knowledge of the structure and variations of the Alpine glaciers. The Heim glacier is the larger, and is to the south of the other; its lower end consists of a vertical face of ice about 300 feet in height. Ice avalanches from this fall on to the glacier beneath with a crash that echoes and re-echoes along the valley. I propose to name this the Darwin glacier, as a reminder that for the first precise description of a glacial valley in England we are indebted to the late Charles Darwin.

At present the south-western glaciers of Kenya do not descend below the level of 15,300 feet, while the snow-line, if I may be allowed to use this objectionable expression, may be taken at about 16,000 feet. This, however, is even more variable on Kenya than usual, as under a vertical sun it is fully exposed to intense heat, and as the gradients in the central core are excessively steep.

The Former Glaciation.—One of the main objects of my visit to Kenya was to determine whether at any former period the glaciation had been more extensive than at present. That this has been the case there is abundant evidence to prove. How far the glaciation extended,

it may be impossible to determine, for the lower limits are now hidden by the jungle of the forest zone.

Immediately we emerged from the forests, we came upon a moraine, which belongs to a line of terminal moraines which runs all round the mountain at the base of the cliffs of the old ice fall, and forms the lower part of the pasturages of the Alpine zone. Some distance, however, below this, in the forest zone, there are some huge ice-worn erratics, and the shape of the ground thereabouts suggests that this is a further set of moraines, and not a mere marginal fringe.

In the higher parts of the Alpine zone the evidence of the former glaciation is remarkably distinct, and perched blocks, striæ, *roches moutonnées*, ice-worn lake basins, and numerous moraines demonstrate the former extension of the glaciation. The evidence will be subsequently given elsewhere.* It has, however, been advisable to refer to it here, owing to the bearing of the subject on the former distribution of the high Alpine flora, which is considered in Section XI. of the present paper.

Settima.—On the west side of the plateau of Laikipia rises another great volcanic mass, the nature of which has, I think, been misunderstood by those who have previously seen it. It was first discovered by Mr. Joseph Thomson in 1883, from the rim of the crater of Longonót; he saw it frequently during the march up the Naivasha-Baringo valley, and passed round its northern edge on his way to the plateau of Laikipia. He therefore marked it in his map as a mountain range, more than 60 miles in length, and proposed to call it the Aberdare mountains.† He represents it as formed of three main peaks; that to the north he called Settima, that on the south, Doenyo Kinangop, and that in the centre, Subugu la Poron. To the west of these he placed a fourth peak or spur, Doenyo Goyito, separated from the main chain by a valley and river, which he marks as the head stream of the Guaso Narok, under the name of the river Ururi.

Höhnel, who visited the mountains five years later, extended Thomson's idea, though he used the names very differently. He cut short Thomson's Ururi, and seems to have entertained serious doubts as to the run of fifteen miles to which he reduced it, as he only dots its course. He, however, very clearly expresses the view of the double mountain chain, showing to the east a long line of hills to which he gives no altitudes, and the whole of which he calls the "Aberdare Kette," or Settima Kette. To the west of these he places two mountains which he calls "Gojito Berg" and "Kinangop Berg;" he estimates their height at 4000 metres. These are separated from the Settima

* See "The Glacial Geology of Mount Kenya," *Quart. Jour. Geol. Soc*, vol. i. part 4. November, 1894.

† Thomson, 'Masailand,' edit. 1887, p. 207.

Kette by a deep but dry valley; through the pass between the two mountains, Gojito and Kinangop, Mr. Ravenstein marks the course of Ferhayi of Pangani's route from Naivasha to Ndoro.

I was led to visit these mountains in the expectation that if their topographical structure were as described in the maps of Höhnel and Thomson, the centre would be found to consist of a nucleus of gneiss, forming what is known to geologists by Suess's term "horst." I therefore struck due south from a camp on the upper Guaso Narok toward the main mass of the mountain, until I clearly saw that a continuation of this course would bring me round on to the grazing land of Kinangop overhanging Naivasha.

As I had no desire to renew my acquaintance with the Masai of this district, and having gone sufficiently far to show that there was no mountain range left unnoticed to my west, and that the mountain to the south was the same that I had seen from the rift-valley, the route was bent slightly to the east. It was now clear that the great mass to the south of me was Thomson's Aberdare chain, and Höhnel's Kinangop and Gojito Berge, and I therefore began the search for the Aberdare chain or Settima Kette of the latter author.

The structure of the country is so different to that which I had anticipated, that it was some time before I could determine my position on the maps. To the south and west was a huge volcanic pile with a very gradual slope, leading up to extremely jagged rocks at the summit. These doubtless represent the central core of an extinct volcano. There

Fig. 5.—Settima from the East: seen from the steppes N. of the Guaso Nairotia and N. of Cp. 73.

was, probably, a double centre of eruption, but the pass between the two is but slightly lower than the main peak, and is not used. Ferhayi of Pangani's route lay across the plain of Rangatan Ndari ("the place" or "grazing plain of sheep,") which is really to the north of the Guaso Nairotia, instead of to the south as represented on our maps; hence it passes round the base of the north slope of the mountain and over the grassy steppes of the Rangatan Busi to the valley of the Murentat, and along this to the Naivasha valley. A party of Wanderobbo, whom I met in the woods here, were very emphatic that there is no other river between the G. Nairotia and the Murentat.

I was able to get the name of the volcanic pile from Masai, Wakáuvi, Wandérobbo, and Wakikúyu, and they all agreed that it was Settima. The Wakikuyu have two names for the two centres of eruption, and call

the southern one Kisúri. I could get no recognition of the name D. Goyito, but it may be in use among some of the Masai in the rift-valley, as my opportunities of talking with them were but limited. All four tribes insisted that Kinangop was never used for a mountain. "It is a Gopo or Rangatan," * they exclaimed, "and not a Doenyo."

I therefore gradually recognized that Höhnel's Gojito and Kinangop are part of the same volcanic mass, and that this is the true Settima. It

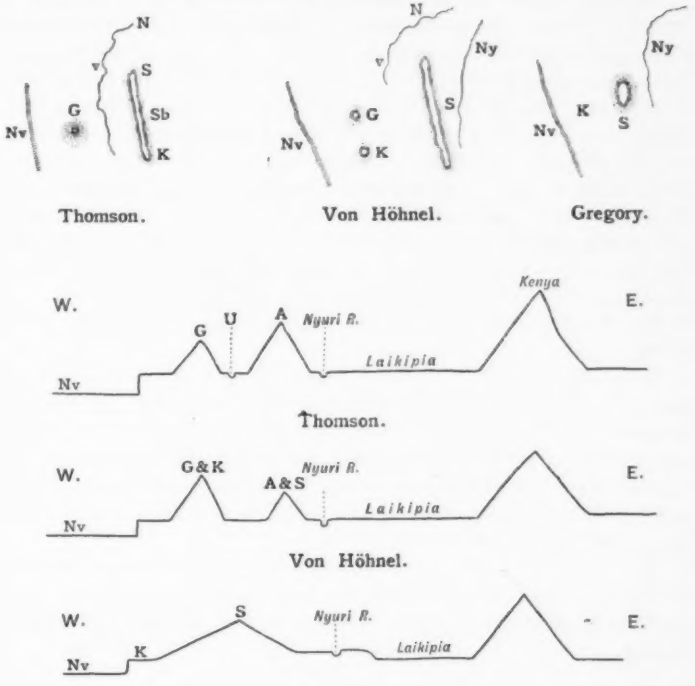

Fig. 6.

followed, therefore, that Thomson's Ururi † is the same as the Guaso Nyiro, and not the upper continuation of the G. Narok. In regard to the names of his four mountains, Kinangop is certainly the pasture land between the western foot of Settima and the rock wall which runs along the meridional rift, a little to the east of Naivasha. Of Subugo la Poron I could get less definite information. Subugo means a forest-covered hill, and it would be appropriate to any part of the eastern or

* Gopo, a level district; Rangatan, a grazing plain.

† Uless Ururi is merely a waterfall, which is the meaning of the word.

northern slope; but it is almost certainly the name of the wooded hills to the north of the route from Laikipia to Rangatan Busi, which Höhnel has called the Marmanett Berge. Ferhagi reported it * as being nine hours north of Settima, which is the right position, if this view be correct. Doenyo Gojito may be only a west spur, unless, as seems most probable, it was based only on an end view of Settima itself. Höhnel certainly marks no mountains west of the main mass.

The next point to be considered is, what place is to be given to Höhnel's Aberdare Kette and Settima Kette, which he places twelve miles to the east of Thomson's Aberdare range. All that occurs there is a flat grass-covered plateau, 6700 feet above the level of the central plain of Leikipia. The plateau is intersected by a series of deep ravines, which have in places a cañon structure, and it bears upon its surface a number of basalt hummocks, which are either the denuded remnants of a lava sheet, or, as is more probable, a number of small volcanic cones. They are very irregular in arrangement, and most of them are separated from Settima by the upper waters of the G. Laschau and the G. Nairotia. The cones are very small and unimportant, and have none of the characteristics of a mountain range. The plateau on which they occur is that division of Laikipia which I have called the Settima plateau (p. 20).

It is clear, therefore, that the name Aberdare mountains must be used either as a synonym for Settima, or else abandoned. As the name has originated in a mistaken view as to the structure of the country, and has been applied by Von Höhnel in a totally different sense to that in which Thomson used it, and as neither Settima itself nor the basalt knolls on the Settima plateau can be spoken of as a mountain range, the latter course seems advisable.

The adoption of the name Settima for the volcanic mass, which is piled up near the western edge of the Laikipia plateau, moreover, helps one to realize its correspondence to Kenya on the eastern side of the same district.

(*To be continued.*)

THE ANGLO-GERMAN BOUNDARY IN EAST EQUATORIAL AFRICA. PROCEEDINGS OF THE BRITISH COMMISSION, 1892.

By Consul C. S. SMITH.

A JOURNEY to Kilimanjaro and back gives little opportunity for the relation of novelties. The mountain and its inhabitants, animate and inanimate, have been well described,† and from a geographical point of

* Denhardt, *loc. cit.*, p. 138.

† A full bibliography of this subject is given in Dr. Meyer's 'Across East African Glaciers.'

view little remained except to accurately map the district. The construction of an accurate map was one of the chief aims of the Commission, and as regards the bolder features I trust that it has been attained. As regards the minor features, it must be understood that time did not allow us to closely examine every part, and that, therefore, much that has been mapped depends on a distant view. Which parts are likely to have been clearly seen may be deduced from the following account of our doings.

During February and March, 1892, at first without skilled assistance, and later with the help of Mr. Imam Sharif, Khan Bahadur, of the Indian Survey, I examined the mouth of the Umba river. Jungle and mangrove swamp combined to make this work difficult and unpleasant. In July, after the rains, I made a fresh beginning. This time I was accompanied by Lieut. G. E. Smith, R.E., as well as by Mr. Imam Sharif. The good services of these two stand on official record, but I am glad of this opportunity to mention them publicly. It may be of interest to record the duties of each member of the expedition. The observations, astronomical and terrestrial, were, generally speaking, taken and worked out by myself. I also computed the triangulation, and prescribed for the sick. I supervised the making a small collection of plants for Kew, and of course conducted the communications with Dr. Peters, my German colleague. Lieut. G. E. Smith, besides assisting with the observations, took at every station panoramic * outlines, upon which were inserted the true azimuths and vertical angles as soon as ascertained. These sketches were most valuable. He also kept the accounts of the expedition. Mr. Imam Sharif † undertook, as a rule, the plane tabling, a duty which he carried out very efficiently, and, besides, sometimes assisted with the observations. We were escorted by twenty Zanzibar soldiers, who, with their officer, had been lent by H.H. the Sultan of Zanzibar. Our caravan varied in number from about ninety to a hundred and twenty porters. Of these, only the head men were armed. The porters, who were young men enlisted at haphazard in Zanzibar, gave a little trouble at first. But East Coast natives are easily disciplined if rightly managed, and when they once understood my ways, there was little ground for complaint. Their cheerfulness and ready obedience under hard fare and hard work is admirable. After five months we came back in our full numbers with the exception of one porter, who died when on detached service, and of two porters whom we left sick in good hands at Taveta.

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* The book of panoramas, together with the other work-books used by the expedition are with me; the field sections from which the maps were prepared, are at the Intelligence Department.

† During the interval Mr. Imam Sharif had performed the valuable service of surveying upon a large scale the town of Zanzibar, and this in spite of its being the rainy season. He has subsequently accompanied Mr. Bent to Arabia.

On beginning work in July, our first care was to astronomically measure the length of the base, Jombo-Kilulu. This done, we passed up the Umba valley for about 40 miles, and then made for Mlalo in the Usambara mountains. The river Umba for the last 15 miles of its course flows in a channel about 60 feet wide, cut deeply into the alluvial soil. Any rainfall in the basin of the Umba makes the lower part of the river overflow all its neighbourhood, a circumstance which the natives well know how to use. They retain the flood water on their fields by means of dams made of earth and weeds. We saw sugar-canes of an unusual size, also good crops of rice and tobacco.

The town of Vanga is the principal place in the Umba district. It is a walled town, with, perhaps, 600 houses. The town is on a creek, which can only be entered near high water even by dhows or boats. It stands on a bank, and is thus raised a few inches above the surrounding ground, which is mostly covered with mangroves, and flooded at spring-tides or in time of rain. The principal commodity exported from the town appears to be wooden rafters, of which any quantity may be cut in the mangrove swamps. The Imperial British East Africa Company is represented in this district by Mr. T. T. Gilkison, a gentleman of whose ready assistance whilst I was in his neighbourhood I would make grateful mention.

Concerning the Digo people, who inhabit the Umba district, I have little to add to the account published in vol. ii. of the Supplementary Papers. Two of their villages, Chole and Kobe, which I visited in 1885, have been destroyed in wars between two sections of the tribe, and certain villages near Jombo have been lately destroyed by a punitive expedition sent by the Imperial British East Africa Company. The Digo villages, except those close to Vanga, are, generally speaking, built in spaces cleared in the thick jungle with but one approach, which is through a narrow path provided with strong low doors, only to be passed in a stooping attitude. The dangers to be guarded against are attacks from neighbours and from raiding Masai, who still occasionally come to the coast to try and steal goats. The Wadigo have now no cattle. All have been taken by pestilence or forays. The village furthest from the coast is Chuini. There was formerly a village near Mwa Kijembe, where Mbaruk-bin-Rashid established himself when at war with Seyyid Barghash. It was, however, abandoned, and now nothing can be seen of the settlement.

The country near the Umba is capable of receiving a population twenty times as numerous as at present; and I do not doubt that it would soon fill up if order were assured. It is difficult, however, to see how that can be unless the power of the Masai is thoroughly broken. The coast jungle belt extends about as far inland as Mwa Kijembe. The district beyond, although believed to be capable of rich yields, looks at present forbidding enough. The country is overgrown with

mimosa and euphorbia in such manner as to make progress very slow, even with pioneers always in front of the caravan. Close by the river there are always fine tall trees and pleasant camping-places. Game is now rare. Zebra and hartebeest and a few small gazelles are all that can be seen, and even these in small numbers. We never saw even the marks of a buffalo. All herbivorous creatures seem to have suffered very heavily from the late cattle disease. The rhinoceros is occasionally encountered, and there are a few elephants, but these are very rare. We saw no live elephants, but we found a dead one near Perani. As regards birds, guinea-fowl and partridges may occasionally be shot.

From the Umba river we went to Mlola, and then up to Mlalo in the Usambara mountains. This departure from our direct route was necessary in order to enable us to shake off attacks of fever, the result of our exposure to malign influences in the hot plain. To reach Mlalo we had to climb the Usambara hills by a steep path, which the weakness of fever made to seem interminable. Arrived at the top, it is seen that the mountain-system is formed of a large elevated area with hill-tops rising from it. Mlalo is a fenced town situated on a small hillock at the upper mouth of the valley down which flows the Umba, making in one place a leap of about 70 feet. Near Mlalo is a Lutheran mission station, under a German pastor, with a gardener as his only companion. They have built themselves a pleasantly situated station, and have opened a school for children. They have no natives actually settled with them, and, as may be expected, the attendance of the children who are unused to school is very fitful. The parts near Mlalo are populous and very fertile. They are well watered with little streams, and the people understand how to irrigate by conducting the water to their fields in artificial channels. Living in the mountains, the people feel safe from marauding Masai, and can build their beehive huts where convenient without needing the protection of a fenced town. The climate is delightful for a European coming up from the hot plains. In the morning the temperature used to go down to 52°, and remained moderate during the whole day * (in September). Sheep, which give excellent mutton, were to be obtained; bananas and sugar-cane and other kinds of native food were plentiful.

After our visit to Mlalo we descended once more into the plain. At the foot of the hills we found several villages, some inhabited by Kamba people, a half pastoral tribe who possess great numbers of goats. All these lower villages are fenced for protection against the war-parties of Masai, which constantly pass near to them. The names of the villages on the west side of Katulifetha are Mnasi, Mbaramu, Mlalo pa Mdimu, and Ponde. The headman of Ponde is a vassal of Mwasi, the

* Mean temperature of Mlalo, 65° Fahr.; of July, 59·7°; of November, 67·8°; extremes 50° and 79°.

chief of Gonja, who himself is a son of Semboja, a Swahili of Persian descent, who left Pangani many years ago and built a town at Masinde, on the west side of the Usambara hills.

Having made a trigonometrical station at Katulifetha we went to Gonja under the Pare mountains.

Between Ponde and Gonja is a plain about 20 miles across, which, when we passed over it in September and in November, was an arid waste, with the usual growth of thorn trees and high grass. During the rains it becomes a swamp, but it is always passable. The water on it drains partly into the Mkomasi, and perhaps into the Mbaramu. Much sinks into the ground.

Gonja is one of several fenced towns which stand not far from one another. The Pare mountains, at the foot of which it is built, seem to contain a number of villages where bananas and sugar-cane and food of all kinds is grown. But the British Commission had no time to explore them. Just above Gonja is the Thornton fall, where a river flows in broad streams over the face of a precipice about 300 feet high. The precipice is of black, smooth rock. The stream is about 100 feet wide as it falls. Seen from just opposite the fall, from a grassy slope covered with large pink balsams, the water as it descends looks like sheets of silver. It is impossible to express in words the beauty of the shapes assumed by the free masses of water as they shoot down the face of the rock into the round pool at the bottom. The base of the fall is about 1050 feet * above the level of the camp, and the river runs down past it. After leaving the fall, it runs in a rocky bed; and for about a mile of its course it goes underground, so that no water can be perceived.

The next important place at which we stopped is Kiziwani, where the Germans have constructed a strong palisade on the banks of a small tributary to the Kiziwani river. During the rainy season the Kiziwani river flows into the northern part of the plain between Gonja and Ponde, and its water is eventually drained off as explained above. At other times, however, it all flows into the earth; a fact which presented itself to our notice in a striking way. On our return journey we reached Kiziwani during a few days' rain. The river was so swollen that we could not cross it, and I looked forward to a long delay or having to bridge the river. The next morning, however, the river had subsided; it was quite low, and we crossed without difficulty. We crossed the river-bed again about a mile lower down, and to our surprise found that no water had come there. The bed was covered with dry leaves. All the flood water off the hills had flowed underground in the intervening space.

From Kiziwani we went to Lake Jipe by way of Gurungani and Baya camp. Water was obtained at both places. "Gurungani"

* This was measured by aneroid, the height of the fall by clinometer.

signifies "at the water-hole." The holes are in a stream bed in the solid rock; they have presumably been worn * by the friction of boulders constantly rolled round by the action of the current. They contain water long after the bed is dry, and are filled by the smallest shower of rain. The water could be drunk, but was far too dirty to wash in.

During a short halt near Kwa Seguiro we encountered some of the inhabitants. They are of the Pare tribe. The men are armed with bows and arrows. Their hair was in little ringlets richly pomatumed with red clay, or perhaps it would be better said that the men attach masses of red clay to their heads by means of their hair. Each little bunch of hair and clay looks like a bead of dull red coral. The women wear kilts of tanned goat-skin, ornamented with patterns worked in white beads. They wear immense brass bangles with punctured patterns about their necks, and great coils of iron wire round the fore arm. They carry strings of beads round the upper arm, and bands of cloth worked with beads round the knees; also bracelets and armlets of very fine copper and iron chain. It is probable that they carry most of their portable property upon their bodies.

From Kwa Seguiro the ground falls gently towards the Jipe lake. Near the lake the slope is so slight that the adjacent land to the south of it no doubt is flooded and swampy in time of rain. The land on the east side of the lake has a slight rise, and the water would probably drain off it quickly, thus making it convenient for living on. The neighbourhood of the lake is the only place where we saw much game in the whole journey. We saw some very large troops of zebra and antelope, chiefly hartebeest, Grant's gazelle, koodoo, also small gazelles with zebra. The numbers have, however, been greatly reduced by the cattle plague, and are not to be compared with what is described by Messrs. Thomson, Johnston, and Meyer. We saw no buffalo, nor the marks of any. A few years ago this animal was very common, especially near the Jipe lake. We only once in the whole journey saw the marks of giraffe. Rhinoceros and ostriches were rarely seen; the marks of elephant we occasionally saw. We found great difficulty even in shooting our food, because the game had been made very shy by several people shooting in the neighbourhood just before our arrival. In Lake Jipe itself are crocodiles and hippopotamus. There are also fish and numbers of birds.

I need not describe the beautiful but unhealthy forest in which the Taveta people have their villages, for this has often been done by more competent persons. I will go on to deal with our proceedings in the neighbourhood, only taking this opportunity to acknowledge our indebtedness to the local knowledge and kind help of Mr. W. Hamilton, a servant of the Imperial British East Africa Company, who, unhappily, has since lost his life at Kismayu.

* This process is fully explained in Dr. Meyer's book.

From Taveta our first expedition was to the crater lake of Chala or Nakurta. We camped on the top of the crater ridge, about half a mile from the highest point. When we had been shown the place where descent could be made to the water, we found no difficulty in scrambling down. On the days we were there the lake showed no effervescence, nor did any currents tend to draw the paddle out of the hand. Lieutenant G. E. Smith went afloat in a pontoon we found there. He sounded, and at a short distance from the south-west end of the lake obtained 28 and 35 fathoms. I imagine that this mysterious lake, which always seems to be about the same level, is fed subterraneously by streams from Kilimanjaro.* A stream which suddenly springs into existence just to the east of the crater, and flows into the Lumi, is no doubt supplied from the lake and prevents its rising above a certain level.

From Chala we went into the Rombo country. We were first hospitably received by a chief named Ngogo, and then by another named Mkinabo. Each village lies hidden in banana groves; that of Ngogo is protected by hedges, but Mkinabo's village is a walled stronghold. A short description of the latter may be of interest, for, I believe, there are many such in the Rombo country. The chiefs' houses are built in an enclosure, of which the rough stone walls are about 11 feet high, and much thicker at the bottom than at the top. The place is entered through a long passage, which is formed by the wall being doubled. The space between the double walls is about 18 inches wide at the bottom, forming a narrow path, but the sloping shape of the walls makes their tops 10 or 12 feet apart. The entrance to the passage is closed by a wall across it, with an aperture about 3 feet high at the lower part, making it necessary to stoop very low in order to enter. At intervals in the passage, which is about 200 yards long, there are walls built across with the same low entrance, so that an attacking party must enter at a great disadvantage. The Rombo country appeared to be in parts very fertile. Bananas are the principal product, but all the East African products, with the exception of cocoanuts, are grown. The fields are kept exceedingly clean, all the stones being collected in little heaps. The cultivated parts are near to villages, and towards the plain they are bounded by a curiously definite line, along which a path runs.

When we left Mkinabo's village, it was our intention to proceed into Useri, skirting the territory named Rombo wa Kulia. The Rombo country has no supreme ruler; each village has its own chieftain. Being well received at one village is, therefore, no guarantee for being allowed to peacefully pass other villages, and so we discovered. About an hour after leaving Mkinabo's village, we began to skirt the lower edge of

* In these regions streams often run a large part of their course underground. In such cases the watercourse on the surface only has water in times of flood.

Rombo wa Kulia. The men turned out of their villages in numbers and watched us pass. At first they ran along parallel to our route, sometimes dancing and waving spears and shields, and sometimes abusing our guides. We marched past them quietly for six or seven miles, not appearing to notice their threats, though prepared for attack. We then approached their northern boundary. Misunderstanding our forbearance, the natives began to close on our rear, throwing heavy stones. When the more advanced had come within about 30 yards, I saw that there was no help for it, and gave orders to fire. The fire of my people was not accurate, but the Rombo men gave back. They soon fled, although they did not lose more than one or two of their number. On our side ten or a dozen men had been bruised by stones, but no one was much hurt. It was then nearly dark, and, not being sure how we should be received in Useri, we descended into the plain, going the next day to Useri camp, then to the Kimangelya camp and to Laitokitok camp.

At Laitokitok we encountered the Masai in some numbers. Having heard at Taveta that the Masai were nearly exterminated by famine, we had not come provided with the proper presents for them. I had to choose between pushing on against their wishes or going back. Having regard to all the circumstances of the case, that is to say, to the tenor of my instructions, to the small number and poor marksmanship of my armed men, and to the fact that I had obtained the geographical knowledge required for present necessities, I determined to give the Masai other presents, and to return to Taveta.

We went to Taveta along the road, and, having paid a short visit to the hospitable Captain Johannis at the German station of Marangu we explored the western part of Taveta territory. We returned to Taveta, and then made for the coast by the way we had come, except that from Katulifetha Imam Sharif went by way of Bwiti.

After reading the preceding the question will occur to many, What are the real capabilities of these districts? In answer I cannot do better than quote a report on the subject by Mr. Imam Sharif, a gentleman well practised in judging the value of land.

IMAM SHARIF, KHAN BAHADUR, *to* COMMISSIONER SMITH.

Zanzibar, March 25, 1893.

Sir,

In accordance with your request, I have the honour to submit to you my opinion with regard to the capabilities of the soil in the parts which we have lately visited.

Firstly, with regard to the parts near Wanga, which are flooded by the Umba. Here we have a red soil, over which black mud is carried by the river floods. The soil appears suitable for sugar-cane, Indian corn, millet, cotton, tobacco, rice, etc., many of which products are already grown there. The ground is, however, mostly uncultivated and covered with jungle.

Secondly, the ground between the Umba and the Usambara hills. In time of rain, this is probably mostly black mud. In the dry season, there is no water. But there is no reason to suppose that it would not be obtained by digging. The ground is at present covered with thorn trees. Except for that, it reminds me of the Punjaub between Delhi and Lahore, which is a thickly populated region. The soil in this part is, however, much superior, especially in being stoneless. It would grow millet and kodo, and perhaps rice in parts.

Thirdly, the district extending from Jombo to Ndea. The soil is undoubtedly very rich, and though at present no water can be obtained, it could, I am sure, be got by digging wells. It would grow rice, tobacco, Indian corn, cotton, and vegetables.

Fourthly, the level ground from Ndea to Ndui ya Rombo, near to the Jipe lake. This ground is not much higher than Jipe lake. Part of it is black ground, swampy in rain, and part is red earth. The whole appears very fertile. The elevation above the sea is about 3230 feet. The black earth would grow rice and tobacco; the red soil would grow cotton, wheat, Indian corn, bananas, indigo, water-melon, and all sorts of Indian vegetables. It can easily be watered by canals from the Lumi river and by water-wheels from the Jipe lake.

Fifthly, the Taveta forest. Here the water seems to be everywhere under the surface. The soil is very rich, and will grow all the above products. There is also already a great quantity of timber, though I do not know the quality of the wood which could be cut.

Sixthly, the lower slopes leading up to the Kilimanjaro. In this is included the parts of Taveta which lie to the west of the forest, and the slopes below Rombo and Kimangelya. Here we have an altitude of about 4000 to 5000 feet. The soil is deep and without stones, and much superior to parts near Dehra Doon, where coffee and tea are grown with great success. Water is not at present to hand in many parts, but could, no doubt, be obtained by wells. The soil would have rich harvests of wheat. At present it is covered with grass, which appears very rich.

I have, etc.,
(Signed) Imam Sharif, K.B.,
Survey of India.

It will be seen that much of the country we visited has a very rich soil. Until the questions of water, labour, and transport are satisfactorily solved, it is not likely that the more valuable products, such as tea, coffee, spices, will be grown so as to give great profits to European planters. But short of this, which some think the chief use of a tropical country, a very large proportion of the parts we visited is capable of supporting a numerous population of natives of hot countries. Large areas now unoccupied might be inhabited by farmers from the crowded parts of

India. The land is at present empty, and until it is populated there cannot be a great trade. On the other hand, it seems probable that there would be a considerable trade if the land were fully populated. But the Masai must first be taught not to raid, the petty wars amongst the tribes must be put an end to, and kidnapping must be suppressed. These points attained, the natural increase of the indigenous population would soon overrun the parts now vacant. But the available space is vast, and there is plenty of room for immigrants. If I am right in believing that land for cultivation is the chief want of many districts in India, I would submit that no greater benefit could be conferred on them than to put in the way of emigration those inhabitants who can be induced to do so; and that, looked at from the African point of view, the measures which are calculated to populate the country are also those best suited to create trade.

The way we went has no very long stretches without water, and but seldom passes over uneven ground. If order were assured, the route by way of the Umba would be one of the most convenient roads to the Kilimanjaro, for there is always water * in the river, and one spot on its banks is as good as another for camping. The long waterless marches which have to be made on the Bwiti road to the south and on the Mombasa road to the north would be avoided. From Mr. Imam Sharif's report, it appears that most of our route passes through cultivable land. If this route ever comes into use, I imagine that the port of Wasin, though smaller than Mombasa, would be found quite convenient for steamers; for dhow traffic it is more accessible than Mombasa.

Note to Mr. C. S. Smith's Map.†

A manuscript "Memoir" ‡ on the surveys conducted by Mr. Smith in 1892 as British Commissioner for delimiting the Anglo-German boundary between the mouth of the Umba river and Kilimanjaro, has been deposited in the Society's map-room, where it may be consulted.

During the first season—February 5 to March 28, 1892—the work was confined to the mouth of the Umba river and the immediate vicinity of the coast. Vanga was taken from the Admiralty chart; a small base-line was measured by the late Herr Vogler, of the German Commission; and the latitudes of three camps were determined by meridian altitudes of stars taken with a sextant. During the second campaign—July 7 to December 2, 1892—the whole of the triangulation and the

* At Perani, in August, the flow of water in the Umba was 8000 gallons a minute.

† Consul Smith is a lieutenant on the retired list of the Royal Navy.

‡ The Convention, together with maps and triangulation chart, was laid before Parliament in the Bluebook, marked "Treaty Series, No. 14, 1893." In the maps made by the British members of the Delimitation Commission, nothing has been inserted which was not observed by themselves, except parts of the coast-line.

plane-tabling of the rest of the country mapped was carried out. The instruments used included a six-inch theodolite, a six-inch sextant, two chronometers, two aneroids and heliographs.

The triangulation upon which the survey depends has as a base a line drawn from the summit of Jombo Hill to the Theodolite Station near to Baba Kilulu Village. The length of the base was found from the difference of latitude and reciprocal azimuths of its ends. This value was checked by comparing the triangulated and astronomical latitudes of Vilima Viwili Hill Station, a point where it was thought there would be no local attraction. The base was finally taken as measuring 124,063 feet. The results of a small triangulation connecting Vilima Viwili with the boundary-mark on Lake Jipe show that this value is probably a few feet too small; but as the mean error of the triangulation reduced to sea-level does not appear to exceed about 0·14 per cent., the doubt as to the exact length of the base does not materially affect the final results.

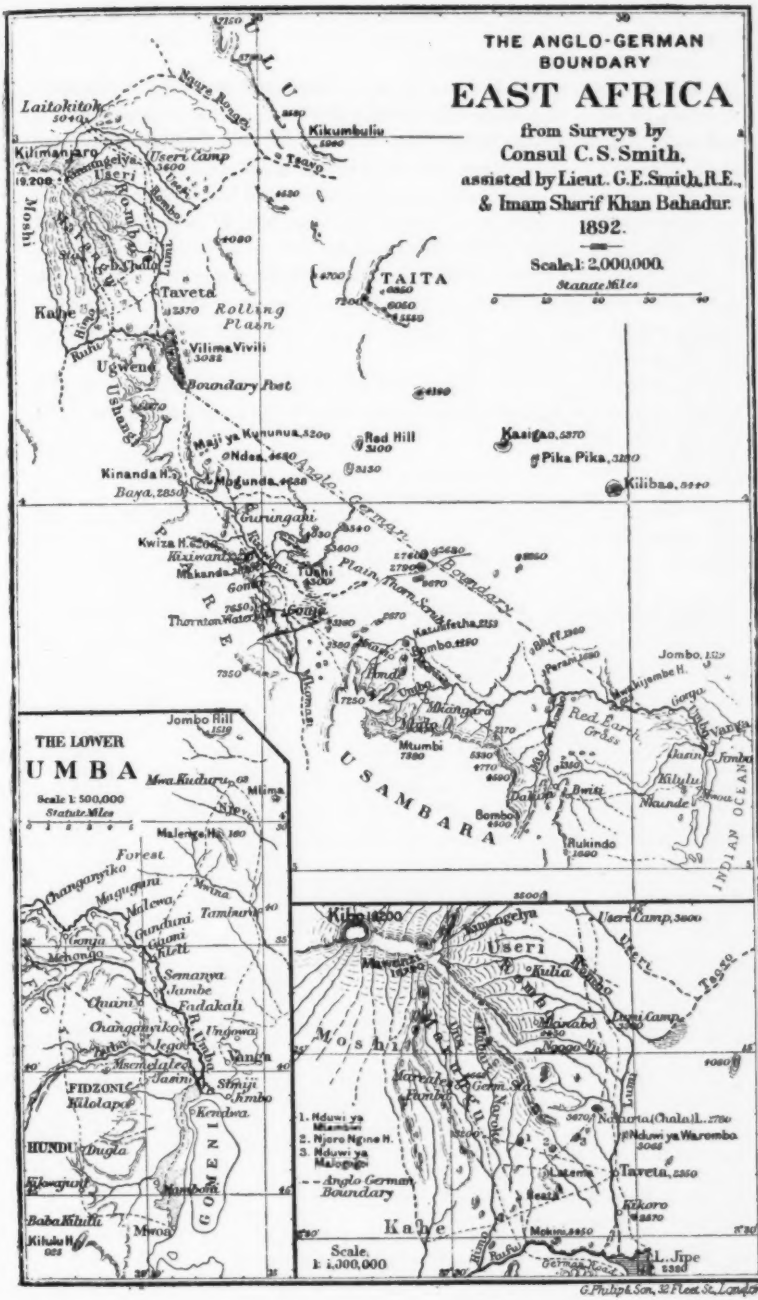
The longitudes throughout depend upon that of Jombo summit, which is assumed, on the authority of the Admiralty Chart No. 1390, to be 39° 12′ 56″ E. of Greenwich.

The latitudes of eight points were astronomically determined by sets of circummeridian altitudes of stars north and south of the zenith. The latitudes of the north and south ends of the base depend upon 78 and 120 observations respectively; that of Vilima Viwili upon 56 observations. The average number of observations for latitude taken at each point is 74. Each astronomical Station is linked to the trigonometrical system, but the trigonometrical values have been adopted. At certain Stations the local attraction was calculated.

At each principal Station azimuths were astronomically observed. The general accuracy of the orientation of the survey is tested by theodolite bearings taken from Great Perani Hill Station to Kibo summit, a distance of 136 miles, and to Maji ya Kununua, a distance of 70 miles. In the first instance, the difference between the observed azimuth and that calculated from the computed latitudes and longitudes of the two points amounted to 27″ of arc; in the second case, to 1′ 42″. The first comparison is thought by Mr. Smith to be more trustworthy than the second.

When surveying, it was impossible to erect marks in front, but quite good results were obtained by observing to the highest points of the hills. The intersection of the vertical and horizontal wires of the theodolite telescope was found a sufficient guide to the exact positions of the summits.

The heights of a few intermediate points are from aneroid observations; but those of all the triangulated points depend upon vertical angles of the theodolite. The datum is high-water mark spring tides at Vanga.



G. Philip & Son, 32 Fleet St. London.

To return to the triangulation.

In 10 triangles all the angles were observed; in 76 triangles only two angles were observed. Excluding the principal stations, 11 points are fixed by azimuths taken from more than two points; 45 points depend upon azimuths taken from but two points, and of these 15 points depend on azimuths, of which one or both were read from only one vernier of the theodolite. The geodetic position and height of each computed point are given in the triangulation chart.

It should be observed here that since the signature of the Convention in Berlin the triangulation has been recomputed, and that therefore the results which appear in the triangulation chart laid before Parliament have been slightly modified.

The variation of the compass was determined at six places. In the neighbourhood of Kilimanjaro it was found to be very uncertain. The results were as follows:—

Baba Kilulu	8° 34′ W.
Mwa Kuduru	8° 46′ „
Perani Camp	15° 52′ „
Small Perani	8° 12′ „
Kiziwani	8° 52′ „
Chala	10° 29′ „

The following are the final results of the triangulation for 16 points:—

	Lat. S.	Long. E.	Altitude.
Principal Points.	° ′ ″	° ′ ″	Feet.
Jombo, summit	4 26 21·3	39 12 56·0	1,519
Baba Kilulu	4 46 12·6	39 7 46·6	511
Great Perani	4 28 10·9	38 45 31·8	1,680
Katulifetha	4 23 24·8	38 22 32·1	2,153
Makanda, summit	4 9 24·0	37 59 20·9	3,829
Mogunda	3 55 33·3	37 51 12·7	4,688
Vilima Vivili	3 34 49·3	37 48 11·3	3,082
Chala, summit	3 19 29·9	37 41 21·3	3,672
Small Perani	4 29 24·3	38 45 40·0	1,365
Mwa Kijembe	4 33 6·2	38 57 24·6	613
Other Points.			
Kasigao	3 49 47·5	38 39 56	5,370
Bombo	4 25 9	38 22 30	4,190
Taita ya Bura	3 25 2	38 17 42	7,200
Kibo (Kilimanjaro)*	3 4 52	37 21 33	19,230†
Mawenzi (ditto)	3 5 52	37 27 41	16,790
Kilibas	3 57 52	39 57 1	3,440

* According to Dr. H. Meyer ('Mitteilungen,' 1893, p. 97) Kibo lies in lat. 3° 3′ S., long. 37° 14′ E., and rises to an altitude of 19,680 feet. This mountain has consequently been shifted 7′ 30″ to the east. This correction is borne out not only by the Victoria Nyanza Railway Survey, but also by Lieut. von Höhnel's recent observations for longitude on the upper Tana.

† Since writing the memoir reviewed above, I have recomputed the heights of the three principal landmarks, and give the results on next page—

The Maps which accompany this paper have been reduced from the Official Map issued by the Intelligence Department of the War Office, on a scale of 4 miles to the inch, except that of the coast district, which is on the scale of 1 mile to the inch.

AN EXPEDITION THROUGH THE BARREN LANDS OF NORTHERN CANADA.*

By J. BURR TYRRELL, M.A., B.Sc., F.G.S.

In the spring of 1892 the Geological Survey of Canada placed me in charge of an expedition sent to explore the unknown area, embracing about 60,000 square miles, lying north of the Churchill River and south-east of Lake Athabasca. We started from Prince Albert on the Saskatchewan River, and, travelling overland, crossed the height of land, and reached Green Lake, where the canoes were put in the water. The Beaver River was descended to Isle à la Crosse Lake, on the Churchill river. At the trading-post of the Hudson's Bay Company, at the south end of this lake, a half-breed and two Chippewyan Indians were taken on the party as canoemen.

After descending Churchill River for 90 miles, we began the ascent of the Mudjatic River. We toiled at our paddles against its rapid current for ten days, until we reached its source in the middle of a flat sandy country. Crossing the height of land, here a sandy plain, we reached a small stream, which in a few miles flowed into Cree Lake. Standing on the summit of a rocky hill, on a beautiful bright evening in July, I enjoyed the rapture of being the first civilized man to look down into the clear depths of this large lake, and to gaze into the distance over its shining waters. Three days were occupied in crossing

Station.	Kibo.		Maweuzi.		Taita ya Bura.	
	Dist. in miles.	Height in feet.	Dist. in miles.	Height in feet.	Dist. in miles.	Height in feet.
Great Perani.....	136	19,220	—	—	79	7172
Makanda	—	—	—	—	55	7187
Mogunda	—	—	—	—	46	7199
Vilimi Vivili	45	19,270	40	16,785	35	7229
Chala	—	—	21	16,798	42	7215
				16,799		7200

As regards Kibo, the observation from Vilima Vivili is clearly the most reliable, but further observations are desirable. Of the other results the mean may be taken.—C.S.S.

* Published with the permission of the Director of the Geological Survey of Canada. Map, p. 480.

it, and then began the descent of the rapid stream which flows from its northern end. The lake lies on the line of contact of the highly altered Archean and the unaltered Palæozoic (Keewenawan) sandstones, and the river flows through country underlain by these latter rocks to the mouth at the south end of Black Lake. Black Lake was crossed and Black River was descended to Lake Athabasca, near the east end of which was a small trading-post of the Hudson's Bay Company. Black Lake and this portion of Lake Athabasca were also found to lie along the line of contact of the altered and unaltered rocks, their northern shores being granites and gneisses, while their southern shores are horizontal sandstones. After obtaining supplies the party returned to Black Lake, and ascended Black River to its source in Wollaston Lake, that large body of water from which issue two almost equal streams, the one flowing to Lake Athabasca, and thence by the Slave and Mackenzie rivers to the Arctic Ocean, and the other to Reindeer Lake, and thence by the Deer and Churchill rivers to Hudson Bay. A survey was made of the west shore of this lake, which was also found to lie at the contact of the sandstone and the gneiss. Geikie River, called after the eminent director of the Geological Survey of Great Britain, was found to flow into the south-west angle of the lake; and here the party was divided, the assistant with two canoes and four men being sent south by the regular Indian route through Reindeer Lake, while with one canoe and three men I ascended Geikie River to its source, crossed some low rocky hills which here constitute the height of land, and entered a beautiful lake surrounded by wooded rocky hills, which was called Foster Lake, after Dr. George Foster, the Finance Minister of the Dominion of Canada. We descended Foster River, portaging our stuff and canoe past its many wild falls and rapids, till we reached Churchill River, up which we travelled to Isle à la Crosse, and thence to Prince Albert. During the season we made 1300 miles of new surveys, 540 miles of which were on routes that had never before been travelled by white men, and 260 miles without guides of any kind except our instruments.

Further to the northward lay the great treeless area of the Barren Grounds. One of my Indian canoemen had been there many (30?) years before, and would occasionally speak of the life led by him at that time, and of the nature of the country through which he had to travel. With his aid I learned of four canoe routes used by the Chippewyan Indians in their annual deer-hunting excursions to the edge of the barren grounds. Two of these routes were said to lead from two points on the northern shore of Lake Athabasca, one from the northern shore of Black Lake, and one from a point on Ice River, north-east of Wollaston Lake. All led through lakes and streams to the height of land, beyond which water was known to flow to the north, but, with the exception of the last route, nothing was known of the ocean to which these waters

flowed. The last route was said to lead through Kasbatua or Ptarmigan Lake, and down the Kazandeze or Ptarmigan River to Hudson Bay. Indian sketches were obtained of all these routes.

On my return from the north, I offered to conduct an expedition through the Canadian Barren Grounds on one of these routes. The course from Black Lake was recommended as being the one likely to lead to the most important and extensive geographical and geological results. In the beginning of April instructions were received from the Director of the Geological Survey to prepare for an expedition. It was then too late to make any arrangement with the Hudson's Bay Company's fur traders on Lake Athabasca, but a letter was despatched to Isle à la Crosse trading-post on the Churchill River to send my old canoe used last year with two good canoemen, to meet me early in June on the Athabasca River, while three Iroquois canoemen were obtained at Caughnawaga, near Montreal, and J. W. Tyrrell, C.E., a surveyor who had already spent two summers and one winter on Hudson Bay and Straits, and who spoke the Eskimo language readily, was engaged as topographical and botanical assistant and Eskimo interpreter.

On May 7 the writer left Ottawa, the capital of the Dominion of Canada, for Edmonton, a terminus of the Canadian Pacific Railway on the Saskatchewan River. Two cedar canoes, each 18 feet in length, and with a carrying capacity of about 1800 pounds, had been sent on ahead from Peterborough, Ontario, but they did not reach Winnipeg until the day after our arrival there, and from there they had to be taken on by express with the party to Edmonton. At Winnipeg a circular letter was obtained from Mr. C. C. Chipman, Commissioner of the Hudson's Bay Company, to the officers in charge of all the northern trading-posts, instructing them to furnish me with any necessary supplies.

The provisions for the voyage were obtained at Edmonton, from which place we drove northwards with horses and carriages to Athabasca Landing, on the Athabasca River, where we put our canoes in the water, and on the evening of May 31 we started down the stream towards Lake Athabasca, leaving most of the provisions to be brought after us by the stern-wheel steamer belonging to the Hudson's Bay Company. These provisions did not reach Fort Chippewyan, on Lake Athabasca, until June 20, causing the party a delay of about ten days; but some of this time was improved in making a collection of fossils from the tar-bearing sandstones on the Athabasca River, from which no fossils had before been obtained. At Fort McMurray, on the Athabasca, we were joined by the canoe and two men from Isle à la Crosse, bringing the party up to a total of eight men and three canoes.

On June 22 we loaded our three canoes with all they would hold, and, bidding good-bye to the last traces of civilization, started from Fort Chippewyan along the north shore of Lake Athabasca. Here the survey must begin, for the shore ahead of us for 160 miles was unsurveyed.

The instruments carried for the work were one Hadley sextant with arc of 8-inch radius, one Gurley's solar compass, two Massey's floating boat-logs, one camera, one mercury artificial horizon, one pocket-chronometer, three good American watches, three prismatic compasses, one aneroid barometer, maximum and minimum thermometers, etc.

The north shore of Lake Athabasca was surveyed with the solar compass and floating boat-logs, checked by observations both for latitude and longitude. The rock was found to be red and grey Laurentian granite, gneiss, often highly garnetiferous, dark green Haronian schists, and white quarzites, the latter occasionally mixed with heavy beds of hematite and limonite, and reddish unaltered sandstones, of Cambrian (Keewenawan?) age.

The Hudson's Bay Company's trading-post of Fond du Lac, near the east end of the lake, was found to be deserted, and we continued eastward over our track of last year until we reached the north shore of Black Lake, where the Indian canoe route strikes off to the north. Here we were to leave all beaten paths, and to strike into the unknown wilderness, without any other guide than the little Indian map obtained the year before. To reach Black Lake from the west, we had been obliged to portage or carry our canoes and all our goods across two stretches of land with a total length of six miles and a half, and now everything had again to be carried over a portage which proved to be two miles and a quarter in length, and which brought us to the shore of a small rock-bound lake on a brook tributary to the Chipman River. This lake has an elevation of 200 feet above Black Lake, or 1200 feet above the sea. We then crossed six small lakes and an equal number of portages, the latter of which averaged nearly a quarter of a mile in length, until we reached Chipman Lake, a very irregular body of clear water surrounded by rugged granite hills. More than a day was spent in this lake looking for the mouth of the upper part of Chipman river. When found, the river was ascended through long narrow lake-like expansions of quiet water, up strong currents, and past five rapids, where we were obliged to portage our canoes 80, 1100, 300, 20, and 930 paces respectively. The last portage terminates at the south end of a large lake locally known as Big Lake, but which is here called Selwyn Lake. It has a length of 55 miles, and an elevation above the sea of about 1350 feet. The shores are generally wooded, the last portage being through a forest of small black spruce and birch, while some aspens are growing on the sides of the hills, and a few white spruce, up to 16 inches in diameter, rise from the stony flats by the streams. The temperature of the water in this lake was 58° Fahr. on July 15.

From the north end of this lake a portage a mile and a half in length leads across the height of land through woods of black spruce, over a morainic ridge, beside a wet valley closely wooded with tamerac, to a lake lying 50 feet lower than the last. This lake I have called Daly

Lake, after the Hon. Thomas Daly, Minister of the Interior for Canada, under whose direction the expedition was sent out. After having travelled northward on this lake for 20 miles, a heavy west wind delayed the party a day and a half, camp being pitched behind a long ösar of sand and gravel, which extended off into the distance in a direction south 40° west. Here a few small aspens were seen, marking the northern limit of this tree, while an occasional small white birch might be found in the thinly scattered groves of tamarac and black spruce, which are everywhere draped with festoons of long threadlike black lichen (*Alectoria jubata*). This lichen is one of the principal articles of food of the Barren Ground caribou in winter, when the ground is thickly covered with snow.

Around Daly Lake are many gently sloping stretches of bright green turf, looking like the beautiful green fields that were now so far to the south of us. Their surface was quite firm to walk on, and was covered with a thin growth of light green lichen, low bushes of cranberry, eyeberry, dwarf Labrador tea, etc. On digging below the surface, I found the subsoil to be composed entirely of bright yellow moss (*Sphagnum sp.*), which had ceased to grow, mixed with a few pieces of wood. At the depth of about a foot the moss was frozen together into a solid mass of ice. On the upper side of these open green fields there is usually a spruce swamp, where the moss is still growing beneath the shadow of the trees, while at the edge of the lake, perhaps half a mile distant, and from 10 to 40 feet lower down, are light yellow vertical or overhanging cliffs of peat, from which large masses of peat are constantly falling on the sandy beach. Digging in a short distance with my hammer into the face of the cliff, which averaged 12 feet in height, we soon reached the frozen moss; through it were many streaks of clear ice. It would appear, therefore, that these sloping bogs are growing on their upper sides, that they then become frozen and cease to grow, and move slowly down the gentle slopes, like true glaciers, until they are undermined by the waves, and break away in cliffs on the border of the lake.

At the north end of Daly Lake we entered a stream which is known to the Chippewyan Indians of Athabasca as the Telzoa, or Wide Shallow River, and camped, on July 23, on the mossy bog near the head of a rapid, where the river is spread thinly over a bed of boulders for a width of 250 yards. On its south side it had no other bank than the wall of moss and ice along the face of the bog.

While within the forest we had been tormented both day and night by immense swarms of mosquitos, but now, in the more open country, the black flies made it almost impossible to move about with any portions of our hands or faces uncovered.

The country that we had been passing through, all the way from Lake Athabasca, had been gently rounded rocky hills of Laurentian gneiss rising here and there through the sandy and stony till; but here, in north latitude 61°, west longitude 104°, the river enters a flatter

country, now expanding into small irregular lakes, and again contracting into swift rapids over boulders. The banks are everywhere ill-defined, and there is no sign anywhere of the stream having cut out a channel for itself. The country is generally low and mossy, dotted with occasional groves of small black spruce. Here and there long ösar of sand and gravel extend across the country in a direction 60° S. 70° W., parallel to the direction of glaciation, keeping this course entirely regardless of surface contours. On the sides and crests of these ridges are groves of fine large white spruce rising to the height of 50 or 60 feet, and measuring 6 feet in circumference 2 feet above the ground. These trees were much the finest that we had seen anywhere since leaving Lake Athabasca.

Further northward, the country became more stony, and the west shore of Barlow Lake, in lat. 62°, is composed of low hills of boulders and irregular masses of granite. Trees are confined to a few isolated groves on the banks of the stream.

It was now five weeks and four days since we left Fort Chippewyan, and our provisions were disappearing rapidly, for we had seen no game that we might add to our stock from time to time; but on the evening of July 28, my brother shot a small poor doe on an island opposite our camp. The next morning, as we were paddling across Carey Lake, making for a high point with a huge boulder lying on its summit, one of the men drew my attention to an immense herd of caribou on the eastern shore. They were standing on low flat land, feeding on soft grass, and endeavouring to catch a little of the breeze from the lake, which gave them some relief from their habitual summer tormentors, the black flies. Swiftly, but quietly, we paddled to the shore, and that afternoon was spent in shooting a number of the best bucks of the herd. The continuance of the exploration depended on our obtaining an abundant supply of meat, and the knowledge of this fact added to our excitement, as we stood in the midst of the tens of thousands of deer, as they ran madly to and fro, endeavouring to escape from a danger which they could not understand. That evening we were tired as we returned to camp, and the men collected sixty-eight tongues from the deer that we had killed. I had determined, if possible, to kill fifty, but we had rather overshot the mark.

Our camp was close to a small grove of stunted black spruce and tamarac. The past ten days had been cold and wet, but the next three days were bright and warm, with a dry south-west breeze, and in that time we cut up and dried about twenty-five of the best of the deer that we had shot. Immense herds were still about us, but we did not shoot any. Instead of our rifles we took the camera, and, walking gently, we would often approach within a few yards of the animals as they were quietly grazing, and thus managed to secure thirty-seven photographs, showing the herds of deer in various positions. The animals were very lean and

poor, but we prepared between 250 and 300 lbs. of jerked meat from the twenty-five that we were able to dry.

On August 1, leaving one man to attend the drying meat, we paddled over to the high point two miles north-west of camp, towards which we had been travelling when we first saw the deer. The point is a long sloping ridge 150 feet high, trending S. 75° W. Its surface is composed of boulders, chiefly of red granite, embedded in yellow sandy till, while on the southern side is an outcrop of coarse red granite, containing large crystals of pyrite. On its crest is a large boulder, 9 feet high, of coarse red porphyritic granite. On the top of this boulder we erected a cairn of stones, under which we put a Worcestershire sauce bottle, with a short record of our trip to that time, and a sketch-map of the course followed. In the centre of the cairn we planted a pole, from the top of which floated a Union Jack. Giving three hearty cheers, we returned to camp.

On August 2 we packed our dried meat in bales, and were off by nine o'clock. We paddled past Cairn Point, and across the lake to a small brook, at whose mouth is a grassy glade wooded with white spruce (*Picea alba*), some trees of which were 8 feet in circumference 2 feet above the butt, and 40 feet high. Beyond the brook is a high hill of bare red, whitish wreathing granite, the first hill of bare unbroken rock that we had seen for many days. During the next few days several bad rapids impeded our progress, and we followed the winding shores of several small lakes, in one of the last of which we came to a small island of almost horizontal and undisturbed white limestone of Cambro-Silurian age, very similar to the Trenton limestone in Lake Winnipeg. This small outline is of great interest, as giving some slight clue to the former great extension of the Palæozoic limestones over much of the north country.

Patches of snow on the sides of the surrounding hills now reminded us that we had reached a sub-arctic region.

On August 6, from the crest of a low hill near the last grove of small black spruce, we saw before us a great lake apparently covered with a solid sheet of ice. Our journey by water seemed to be at an end, and the men were anxious to turn back; but we pushed on, and when we reached the lake we found a narrow lane of open water close to the shore on which we could travel with our canoes between the ice and the land. The mist rising from the ice generally prevented us from seeing the lake at all clearly.

Shortly after entering the lake we were delayed for three days by a heavy storm of wind and cold rain, which afterwards turned to snow; and on the morning of August 11, as we were leaving camp, there was a thin skin of ice on the tarpaulins. That day we found the ice tight against the shore around the point of a high peninsula, and were obliged to search for a narrow place where we could carry our canoes

and loads across to the open water beyond. The same evening we reached another point against which the heavy ice was crowded, and as it was too late to attempt a portage, we camped for the night at the mouth of a rapid brook, where he had hoped to have found a few willows for fuel. No willows could be found, but the men succeeded in boiling water for tea with some green dwarf birch (*Betula glandulosa*).

The next morning we had the pleasure of seeing a clear channel of open water between the point and the ice, along which we were able to paddle with our canoes. We followed the shore inside of some long rocky islands, between the ice of the lake and the land. The shore everywhere descended easily in beautifully green slopes to long sandy beaches between rocky points. The country through which we had been passing all the way from Lake Athabasca had been underlain by red and grey granitoid gneisses of Laurentian age, but here we entered a country underlain by sandstones, conglomerates, red quartz, porphyries, and dark green traps precisely similar to the Keewnawan or Upper Copper-bearing rocks of Lake Superior, and probably of the same age.

We followed the shore of the lake closely, searching for the river that flowed out of it, until the evening of August 15, when another cold storm of wind and rain delayed us for two days. On the evening of August 17 we found the outlet of the lake, having followed the shore for 117 miles. The water in the lake is clear and pure, though it has a flat taste like snow-water. Whitefish are very plentiful in it. The lake is probably the Doobaunt lake which Samuel Hearne walked around in 1770, and it appears to be deep and of large extent, but its southern and part of its eastern and western shores were not seen.

The river discharging it, which flows from the bottom of a bay at its northern end, at first winds gently between sloping grassy banks, often covered with boulders. Here we saw the first unmistakable signs of an old Eskimo encampment—stone circles, dog whip-handles, stone arrowheads, pieces of the ribs of kyacks, etc.

A few miles below the lake the river rushes through a narrow gorge caused by the decay of a trap dyke, which has risen through the surrounding Keewenawan conglomerates. Past this gorge it was necessary to make a portage 2½ miles in length. At its eastern end the portage runs over sandy ridges and terraces which appear to represent old raised sea-beaches, with an approximate elevation of about 400 feet above the present sea-level.

The next day, after crossing the portage, we paddled across a small lake and down the river till within a few miles of Lady Marjorie Lake, where we saw a solitary deerskin tent on the right bank, 10 feet above the water. Very soon we saw Eskimo running about, and it was evident that the camp was in consternation, for they had seen our three canoes coming down the river from the land of their hereditary enemies, the Chippewyan Indians. When we were within hailing distance, my

brother called out, "Chimo, Chimo; Ta'appe tacco Innuit; Kudluna awunga" ("Peace, peace; we are glad to see Eskimo; we are white men"), on which a number of people rushed from the tent and answered, "Chimo, Chimo." We pulled in to the shore, and were met on top of the bank by a tall, fine-looking Eskimo with a spy-glass in his hand, and wearing a pair of moleskin trousers and a deerskin coat. He was quivering with nervousness, but after we had shaken hands I presented him with a plug of tobacco, which set him more at his ease. My brother talked to the man for a few minutes, and then the women unlaced the front of the tent, which had evidently been tied up as tightly as possible, and invited us to come in. The tent held one dual family consisting of one man, two wives, and five children. The man drew us a rough map of the river down to salt water, but he could give us no idea of the position of the mouth of the river, and he appeared to know nothing of Marble Island or the coast of Hudson Bay. However, the fact that this man had a telescope, two old guns, and a pair of moleskin trousers, assured us that he belonged to the Eskimo of Hudson Bay, rather than to those of the Great Fish River and the Arctic Ocean.

After remaining a few hours with this friendly family, we proceeded on our way, hoping to meet other camps of Eskimo on the banks of the river from time to time, and to gain additional information from them.

On Lady Marjorie Lake, where we spent two days in a search for our course, being delayed by heavy winds, we shot several fine fat bucks, and replenished our supply of fresh meat. Shortly after leaving this lake we travelled north-westward, down a well-defined river, and our hearts sank as the river took us further and further towards the north-west, for we were making straight for the Great Fish River, which flows into the Arctic Ocean, and while we were only about 100 miles from that river, we were 350 from the nearest point on Hudson Bay. At length we reached a wide sandy plain, on which we were overjoyed to see willows growing, while around were scattered drifted trunks of spruce trees a foot in diameter, and limbs of balsam poplar. We had reached the mouth of the west branch of the Telzoa River, the banks of which must be wooded not far above the forks.

It was August 25, we were in north lat. 64° 36', and the night was cold, so that we enjoyed the luxury of a fire, while the men baked bread and boiled a large supply of meat. Our safest plan of operations was now to ascend the west branch of the river and reach the wooded country before the winter set in, and find our way to Great Slave Lake, or back to Athabasca Lake. But I could not forego the pleasure of tracing to its mouth the great river that we had descended so far. Therefore the next day we pushed on to Aberdeen Lake, whose gravel shores were still deeply scored by the shoving of the spring ice. That evening I called the men together and told them that they had a long journey yet before them, that the summer flowers had all withered, and

that winter would very soon be on us. If they wished to reach their homes they must exert themselves to the utmost. After that I had no reason to complain of their unwillingness to work. We continued our journey eastward, losing one day in a search for the outlet of Aberdeen Lake, and two days from a heavy storm, until on September 2 we reached the west end of Baker Lake, where old Captain Christopher had been before us more than a century and a quarter ago. We had now accomplished our journey through the unknown interior country, and had gained the first recognizable point since leaving Black Lake, 810 miles behind us. The shore ahead of us was still practically a *terra incognita*, but we knew that by following it we should eventually reach Fort Churchill. We had surveyed a line of the above length through the very middle of the area that we had set out to explore. Of the distance 538 miles were over lakes, where the distances were measured with a Massey's floating boat-log, and the bearings taken with a solar or prismatic compass; 272 miles were on rivers, where the distances were estimated and the bearings taken with prismatic compass; but the distances thus obtained were constantly checked by observations for latitude and longitude. The lengths of the portages were obtained by careful pacing.

The stormy weather of autumn had now set in, and often prevented us from launching our canoes for several days at a time.

In the past month the small Arctic caribou had been plentiful in the country through which we were travelling, so that we had no difficulty in obtaining an abundant supply of fresh meat, but these animals now became very scarce, and on September 3 we shot the last deer of the season.

The survey with solar compass and boat-log was continued along the north shore of Baker Lake, which was found to lie along the line of contact of the Laurentian gneisses to the north, and the red Keewenawan conglomerates to the south, the former including bands of crystalline limestone. The Keewanawan rocks had been traced from Doobaunt Lake to Baker Lake, a total distance of 225 miles as the crow flies.

At the head of the river flowing from Baker Lake we met the incoming tide, and as the currents in Chesterfield Inlet were therefore very irregular, it was no longer possible to use the boat-log with any degree of accuracy, and the remaining distances were estimated, checked by observations for latitude and longitude. Chesterfield Inlet was found to be a deep narrow tidal fiord, with shore of red and grey granite and gneiss.

On September 12 we reached a rocky point just south of the mouth of Chesterfield Inlet, where the heavy waves, driven in from the open sea by a south-east wind, obliged us to struggle ashore, and prevented us from starting out again on the same day. Behind our camp was a

sandy terrace in which the Eskimos had dug the basements of many of their snow houses or tents, while around they had stood up on end many huge slabs of stone. We now began the heavy task of travelling down the tidal shore of Hudson Bay in our little open canoes. During the first three days the weather was beautifully fine, and we covered more than 100 miles of the distance, so that there appeared to be every chance of our reaching Fort Churchill on open water. To the right lay the bold rocky shore of dark green Huronian schists, while to the left Marble Island raised its bare white hills out of the dark-green ocean.

On the evening of the third day, as we were about to cross Corbett's Inlet, a heavy wind sprang up from the south-east, and forced us to camp on a small sandy island, where we were obliged to remain for a day and a half. On September 17 the wind went down, and we started to cross the 7 miles of open water which lay between us and the south side of the inlet. When about midway of the distance, a heavy north-west wind sprang up and increased to great violence, so that every moment we were in danger of being engulfed by the waves which broke over us, until we ran behind a projecting reef and were safe, but wet to the skin with salt water. Storm after storm now broke over us, and in twenty days, from September 15 to October 6, we were unable to advance more than 120 miles.

On the morning of September 20 the ice was three-quarters of an inch thick on the small ponds on the rocks; on the 22nd the ground was covered with a heavy fall of snow; and on the 25th we walked 20 miles, often on the crusted snow, in search of game, but all that we were able to shoot was one ptarmigan, which we divided for dinner.

Shortly afterwards one of the men had the good fortune to shoot a white bear, and for the next five days, during which time a heavy storm was raging, we subsisted on the meat of this animal. We had been able to collect some lichens and small plants from the tops of the knolls, and with these we occasionally made a small fire; but on the night of October 3 the wind went down, and the snow fell quietly and peacefully, covering hills and valleys with an even white sheet, and burying all the reindeer moss, so that there was no chance of obtaining even that any longer for fuel. This made our condition almost desperate, for we were then 270 miles from Churchill, on a bleak coast, with only a few pounds of bear's fat for food, without fuel, and 200 miles from the nearest wood. Two more days were spent struggling southward in our canoes, but at night and morning we had to carry canoes and cargoes a long distance to and from dry land, and, though we worked hard, we made only 12 miles.

On October 6 the winter had settled down on us with all its arctic rigour, and even in the sun at midday the thermometer remained considerably below freezing-point. We were without food or fuel, and our clothes were worn to rags. Two hundred and sixty miles of shore still

lay between us and Churchill, the nearest point where we could obtain supplies. Our canoes were loaded with specimens of rocks and minerals which we had collected, both in the interior and on the coast. It was clearly impossible to reach Churchill travelling as we had been travelling, and I therefore decided to leave everything behind us which was not absolutely necessary for the safety of the party. The shore was a vast snow-covered plain, but a slight gravelly eminence was chosen, half a mile from high-tide mark, and on it one canoe, all our rock specimens, instruments and whatever else was not necessary for our existence, were carefully piled in a heap and covered with tarpaulins. Our note-books, photographs, and collection of plants, with guns, ammunition, blankets, and two tents, were put in the remaining two canoes, and thus lightened, and with four men with paddles in each canoe, we started southward again, determined to reach Churchill by water if possible.

The shore was very flat, with a tide of from 12 to 14 feet, and at ebb tide the water was generally several miles from the line reached by it at high tide, so that we were able to land or launch our canoes but once in each twelve hours, namely, at the time of high tide. Any rocks seen on the shore were Laurentian granites and gneisses.

We struggled onward for ten days, living on what few ducks we could shoot in the open water. The weather was very cold, and the water that was splashed over us by the wind froze on our clothes and beards. We had constantly to break the ice from our paddles, as they became too heavy for us to swing. When night settled down on us on October 14 it was ebb tide, and we were out among ice and boulders almost out of sight of land. That night we spent in our canoes, one of our men having both of his feet badly frozen, while another was sinking rapidly with an attack of dysentery. On the afternoon of the 15th we gained some solid ice, and hauled our canoes over it to the shore, where we pitched a tent just as a heavy storm of wind and snow broke over us. There was now driftwood on the shore, and with it we made a fire and cooked some ducks that we had shot, getting the first food that we had tasted for thirty-six hours. Assured that we were not very far from Churchill, I sent two men on foot through the snow to the fort for assistance, and on the afternoon of the third day they returned with four dog-teams, bringing us pork and flour, and on October 19 we were carried to Churchill. Here we obtained shelter with the clerk in charge for the Hudson's Bay Company, and we received every kindness from the Rev. J. Lofthouse, the missionary to the Eskimo for the Church Missionary Society; but fresh meat was not to be had, and the men gained strength very slowly on the limited diet of salt pork, flour, and oatmeal.

We remained here until November 6, when we crossed the Churchill River on the new ice, and started on snowshoes for York Factory. We had secured one dog-team from the Hudson's Bay Company to carry our provisions and the man whose feet had been so badly frozen, while the

other men were obliged to haul their bedding on small toboggans. Other dog-teams belonging to the Hudson's Bay Company assisted us for part of the way, as they were going to recover some stuff that had been left on the shore between York and Churchill by one of their officers in the latter part of September, it being considered impossible to travel further by water so late in the season.

When we arrived at Nelson River, the scanty supply of provisions that we had been able to obtain at Churchill was exhausted. The river was found to be full of running ice, so that we were unable to cross it either in the boat which we found there, or on the ice, and our party, now augmented by three local Indians, was obliged to remain on its bank for ten days, subsisting on the few rabbits, foxes, etc., that we were able to catch. The weather had been very cold, the thermometer often falling at night to 20° Fahr. On November 24 we arrived at York Factory, where we were able to procure a plentiful supply of provisions. The officer in charge here for the Hudson's Bay Company is a medical doctor from Aberdeen, Scotland, and as Michel, the man with frozen feet, was unable to walk, and we were unable to obtain transport for him, we left him under the doctor's care, to be sent out with the winter packet.

We obtained another dog-team and provisions for twelve days, and on November 28 started on snowshoes through the deep unbroken snow for Oxford House, 250 miles distant. The country passed through was generally flat and swampy, and thinly wooded with small black spruce. Late on the evening of December 7 we arrived at Oxford House, tired and footsore after our ten days' walk. After a delay of six days, waiting for fresh teams of dogs, we again started and arrived at Norway House on December 20. Here the men from Isle à la Crosse and Prince Albert were paid off and sent home up the Saskatchewan River, while I obtained fresh dog-teams and drove southward across Lake Winnipeg to Lower Fort Garry, on the Red River, where we arrived on the evening of January 1, 1894, and the next day we reached Winnipeg.

During the course of the expedition we travelled, beyond our railway journeys, a total distance of 3200 miles, viz. 2150 miles in canoes, 610 miles on foot on snowshoes, 350 miles in conveyances drawn by dogs, and 100 miles in conveyances drawn by horses.

While so travelling we made the following surveys:—

Seven hundred and seventy miles over lakes, where the distances were measured with a Massey's floating boat-log, and, in order to avoid local attraction or weakness of the magnetic needle, the bearings were taken as much as possible with Gurley's solar compass. Two hundred and seventy-two miles of river, and 360 miles of the tidal shores of Chesterfield Inlet and Hudson Bay, where the distances were estimated and the bearings taken with a prismatic compass, the variations being constantly determined by the solar compass. Throughout the above distances

observations were taken with the sextant and artificial horizon as often as possible both for latitude and longitude.

The remaining portion of the shore of Hudson Bay, between where the instruments were left and Fort Churchill, about 250 miles in length, was geologically examined, and the position of the mouths of the rivers roughly ascertained.

A careful track survey was kept of the route travelled over on foot from Churchill to York Factory, a distance of 200 miles, the bearings being taken with a prismatic compass, and a rough track survey was also kept through the 400 miles of wooded country from York Factory to Norway House.

A very full collection of plants, including 229 species, was made by my assistant, Mr. J. W. Tyrrell, in the new country passed through. We also took 260 instantaneous photographs, which illustrate the principal physical features of that northern country, and the immense herds of reindeer that roam over it.

NOTE ON MR. J. B. TYRRELL'S MAP.—On this map are shown the results of two surveys, made by Messrs. J. Burr Tyrrell and J. W. Tyrrell, in 1892–93. On the first expedition Cree Lake was visited; a survey was made of the west shore, Wollaston Lake, and the positions of other important points were fixed. On the second expedition the instruments used were an 8-inch sextant and artificial horizon, a Gurley solar compass, Massey's logs, photographic camera, chronometers and watches, prismatic compasses, aneroid barometer, and maximum and minimum thermometers. The north end of Lake Athabasca was surveyed and fixed by observations for latitude and longitude. At Black Lake all beaten paths were left, and from this point many important corrections and additions were made to the sketch-maps previously existing. The topographical results of these two expeditions have been carefully laid down on the map.

THE HISTORICAL GEOGRAPHY OF THE HOLY LAND.*

By COUTTS TROTTER.

THE author of this work has carried out so successfully the task which he proposed to himself, that we may do well to state in his own words what his purpose in writing was. "What is needed," he says, "by the reader or teacher of the Bible is some idea of the main outlines of Palestine—its shape and disposition; its plains, passes, and mountains; its rains, winds, and temperatures; its colours, lights and shades. Students of the Bible desire to see a background and to feel an atmosphere—to discover from the 'lie of the land' why the history took certain lines and the prophecy and gospel were expressed in certain styles—to learn what geography has to contribute to questions of Biblical criticism—

* 'The Historical Geography of the Holy Land, especially in Relation to the History of Israel and of the Early Church.' By George Adam Smith, D.D. With six maps. Hodder and Stoughton.

above all, to discern between what physical nature contributed to the religious development of Israel, and what was the product of purely moral and spiritual forces. On this last point the geography of the Holy Land reaches its highest interest."

It will be generally admitted that the climate and resources of a country, and the physical configuration, especially that of its frontiers as bearing on its relations with its neighbours, have a considerable share in moulding the national character, and directing the course of history. But in his last sentence above quoted, the author seems to ask somewhat more from "Geography" than this. He would ascertain not only its contribution to "religious development"—a sufficiently difficult question—but also the proportion which this contribution bears to the action of certain other forces of an exceptional character which, in the case of Israel, he seems to regard as differing in degree, if not in kind, from the ordinary leading of Providence in the affairs of nations. And this seems even to involve some inconsistency; for whereas, in dealing with other tribes and races, as the Philistines, the Phœnicians, or the people of Northern Palestine, he allows free scope to the ordinary influences we have referred to, in the case of "Israel" he finds the action of these to be much more limited, and to be supplemented or counteracted by the special spiritual insight which he attributes to this branch of the Semites, or by Divine intervention; and occasionally his illustrations appear to us hardly to support the weight of the inferences he would found upon them. We cannot, however, pursue this very interesting branch of the subject, which, though no adequate notice of the work could ignore it, hardly falls within the province of this *Journal*.

In dealing with the geographical integrity of Syria, the writer points out, what is not always borne in mind, that though its eastern limit is well marked by the deep gorge of the Jordan valley, Syria is nevertheless essentially a part of the Arabian peninsula. Ethnologically, also, this is very markedly the case. From all time Semitic tribes—Hebrews, Midianites, heathen and Moslem Arabs—have swarmed up into it from the east and south-east. They seem to have been always stopped, northwards, by the Taurus range, and westwards by the sea, with two famous exceptions, the Phœnicians and the Jews. The former were the early pioneers of commerce; the latter, bigoted, exclusive, and provincial in their secluded mountain territory, gave, in the fulness of time, to the western nations their monotheistic faith.

Dr. Smith observes that until and except under the great stimulus of Islam, the Semitic tribes were never capable of a national combination; Syria, indeed, as the highway for war and commerce between the great empires of the ancient world, could hardly have made herself an independent power. His singularly clear description, district by district, of the physical features of the country enables the reader to follow alike the movements of those great forces, and the not less

interesting local campaigns and expeditions recorded in the historical books of the Old Testament. Recent criticism of these, combined with the labours of the explorers, has, as is well known, thrown much light on the Biblical narrative. These studies have, in fact, prepared the way for such a work as the present; without them neither the picturesque local colouring nor the historical deductions which give this work its charm and value would have had the same accurate foundation.

The "physical sketch map," p. 5, illustrates at a glance the writer's description of the main features of the country, to which, but always under reasonable limitations, he traces the characteristic qualities of the various inhabitants, and the vicissitudes of their history. For example, with reference to the two parallel belts of high land which run down from the Lebanon on each side of the Jordan, he points out that, whereas on the east side a region equal or superior to the western in natural resources had its prosperity always paralyzed by its proximity to the desert and the absence of any natural barrier against the plundering nomad tribes, the corresponding region, protected to some extent by the Jordan valley, and further by its own escarpments, had a very different destiny; Judæa being, besides, also isolated on the west, by a series of valleys and low hill country, from the Maritime Plain. As regards this last, we have again a contrast between the inhabitants of its southern portion, the Philistines, who, owing to the harbourless character of the coast, were never a sea-going people, and the dwellers to the north of Carmel, where the comparative frequency of sheltered points and inlets gave the Phœnician merchant his opportunity. Across the Maritime Plain, and by easy roads into the great plain of Esdraelon, lay the beaten track of Egyptian armies going north to Tyre and Sidon and Asia Minor, or eastwards by the valley of Jezreel to the Jordan and Damascus; the route also of Syrian, Babylonian, and Persian invaders. Later on, across Esdraelon came the Greek settlers of the Decapolis confederacy, the Romans, and, a thousand years after, the Crusaders.

Going into greater topographical detail, the writer describes the Shephelah, or low hill country which borders the territories of Judæa and Samaria on the west. And here he shows that while towards the north the Shephelah merges insensibly into Samarian territory, it is separated from the Judæan plateau by a series of valleys which all contribute to the strategic strength of the frontier. It is true that certain cross-valleys, as Ajalon, run up through the Shephelah into the plateau, to within a short distance of Jerusalem, but they are defensible with comparative ease, and as a rule invaders have not attempted them without first securing other points of vantage outside the plateau.

The enthusiastic interest he feels in the country lends, we think, sometimes too vivid a hue to his landscapes; his account, however, of Samaria and Galilee, of the richness of the scenery, the wealth and variety

of incident which crowds its history, the character he draws of the people as contrasted with the Jews, and the extent to which they were affected by Hellenic influences, is as interesting as it is eloquent, and an excellent example of what "historical geography" should be. It is hardly necessary nowadays to point out how much the "Sacred History" gains, how much light is thrown on it, when it is studied on the modern method, and taken in conjunction with, and as an integral part of, the history of the surrounding regions.

We have not space to refer to many other points of interest in the volume, such as the identification of sites, the question of the origin of the Philistines, or the historical influences, Greek, Herodian, and Roman, by which the early Christianity of Palestine was influenced. We can only add that alike for the travelled and untravelled reader many a fruitful train of thought is suggested, and much varied light thrown on the subject by this very able and ingenious presentment of it.

The maps are excellent; only in the general map of Palestine the colouring for the greater altitudes is so dark as to make the smaller letter-press practically illegible. There are a few misspellings of Arabic and other words, and an occasional obscure or inaccurate sentence; these will no doubt be rectified in another edition.

THE EXPLORATION OF ICELAND.

THE *Verhandlungen der Gesellschaft für Erdkunde*, No. 5, 1894, include a paper by Dr. O. Cahnheim on the joint journeys in Iceland, made in 1889 and 1892 by himself and Dr. Karl Grossman, whose account appears in the *Geographical Journal* for the same month. Dr. Cahnheim treats of practically the same matters as did Dr. Grossman, and his paper is illustrated by a different selection of photographs; the want of a map, however, makes it somewhat difficult to follow the route.

The same publication contains a translation of a letter from Mr. Thoroddsen, dated Reykjavik, April, 1894, in which are stated the preliminary results of a journey made by the writer last year in the comparatively unknown districts in southern central Iceland, and between that region and the coast. Mr. Thoroddsen, favoured by good weather, extended his travels over nearly the whole of the Vestur-Skaptafellsýsla, between the Vatnajökull and the Mýrdalsjökull, up to the hitherto unvisited sources of the Skaptá and Hverfisfljót. Fairly complete surveys were also made between the Tungná and the great Skaptá; the lava streams sent forth by the elongated crater of Laki in 1783 were measured, and the geological features explored down to the *sandar* or tracts of sand along the coast.

In the Vestur-Skaptafell district the lower beds are exclusively palagonite tufas and breccias of two formations. The older tufa, which is the more widely distributed, is greatly disturbed by innumerable layers of intruded basalt, and upon it the newer lies unconformably in horizontal strata, probably of post-glacial age. In these latter basalt is entirely absent, but here and there beds of conglomerate occur. Between the Tungná and the Skaptá the tufa is greatly eroded, and the appearance of the ranges of hills singularly different from that familiar in other parts of Iceland. Liparite occurs only twice, in Faerines, eastwards from Skeidarárjökull,

and in Torfajökull. In the latter it is found in large masses, covering an area of nearly 60 geographical square miles, and underlying the snow-cap of the mountain, which rises to 3300 feet. Three recent (post-glacial) streams of liparite-lavas extend from the hills to the north of Torfajökull, and are noticeable for their surface coverings of obsidian and pumice already described by Mr. Thoroddsen in 1889. Most of the lavas lie just on the limits between Liparite and Trachyte, containing 63 to 69 per cent. of silica.

Pre-glacial dolerite lavas are widely distributed over the highlands to the north of the Sidá district, between the rivers Hverfisfljót and Skaptá, in a manner very similar to the more recent formations, from which they are chiefly distinguished by ice-markings. Mr. Thoroddsen made many observations of the trend of the scratchings, and was led to conclude that the centre of glacial motion was not, as at present, in the Vatnajökull, but that the great ice-stream from the interior, disregarding the smaller inequalities of the land surface, moved downwards across the depression between Mýrdalsjökull and Vatnajökull, and was split by the hills at the base of the former; so that one arm was deflected eastwards towards Sidá, and another towards the southern lowland of the Thjórsá. The littoral between the spurs of Hjörleifshöfdi and Ingólfshöfdi was apparently submerged at the end of the glacial period; it is bordered on the north by rocky cliffs bearing unmistakable traces of the action of the sea.

The Vestur-Skaptafell district is enclosed by the two great snow-fields of Mýrdalsjökull and Vatnajökull, 300 and 2300 square miles in area respectively. Nineteen glaciers have now been traced to the former, while the whole of the western side of the latter feeds one immense ice-stream—the Skaptárjökull—50 miles in length. Swift streams, varying in colour from milk-white to a chocolate brown, issue from all the larger glaciers and carry down large quantities of mud. All along the coast of this region are found expanses of gravel and mud, interspersed with occasional lava beds, and, at a distance from the glacier rivers, isolated patches of vegetation. Cultivation is entirely confined to mountain slopes, beyond the reach of glacier-water. The barren "sandar" cover 560 square miles, whereon are found mud, gravel, beds of scoriæ, and quicksands. Severe floods are not infrequent, caused either by bursting of dams of ice, or by volcanic eruptions under the glaciers. The immense changes produced by the latter agency are perhaps best illustrated in the Mýrdalssandur during eruptions of Katla. On May 11, 1721, so great a mass of glacier ice was suddenly ousted from its position that the sea was covered to a distance of 3 miles from the coast, and the Mýrdalssandur flooded to a depth of 300 feet.

The volcanoes of those regions may be divided into those covered by glacier ice and those exposed to the atmosphere. The former are only accessible immediately after an eruption, and, so far as is known, they never send out streams of lava, only ashes and scoriæ. In the latter the vents are either long fissures, or series of small craters; and these volcanoes have covered an area of about 400 square miles with lava-beds. The most remarkable is the immense fissure stretching in a north-easterly direction, from the Mýrdalsjökull to Mount Gjátindur, a distance of 20 miles, and known as the Eldgjá (fire-chasm). This rift, which averages 400 to 600 feet in depth, has overflowed at three different points, covering with its lava-streams an aggregate of nearly 200 square miles. Mr. Thoroddsen, from a study of existing records, places the date of its formation at about 900 A.D.

Several weeks were spent amongst the craters and lava-streams of Laki, and a special study was made of the great eruption of June to October, 1783. A complete report on the configuration of the district before and after that catastrophe is being published in the "Dansk Geografisk Tidskrift," from which it appears that

about 2 cubic miles of lava were poured forth during the five months, and over half a cubic mile of ashes and scoriæ.

We are glad to observe that Mr. Thoroddsen hopes to extend his explorations during the present summer, chiefly in the Austur-Skaptafell and the eastern part of the glacier-region.

THE MONTHLY RECORD.

THE SOCIETY.

The New Session.—The first meeting of session 1894-5 will be held on Monday, November 12, when Mr. H. H. Johnston, C.B., will give a paper on the British Central Africa Protectorate, copiously illustrated with new photographic slides. The second meeting of the session will probably be devoted to a paper by Mr. Walter B. Harris, on his recent journey to Tafilet, Morocco. As will be seen from the programme issued with this number, several other important papers may be expected during the session. In the same programme will be found some details of the changes which have been made in the Society's premises during the recess, including the introduction of the electric light, large additions to the library and map accommodation, and other improvements which it is believed will add to the efficiency of the Society, and promote the comfort of the increasing number of Fellows who visit the Society's rooms.

The Society's Prizes and Certificates to Training College Candidates.—The following list of candidates for Queen's Scholarships in English Training Colleges, at the examinations of July last, who have been successful in gaining the Society's prizes and certificates, has been forwarded by the Education Department: PRIZES (*Males*)—Frank Ash, Slough Board School; James A. Barker, Hackney Wick, Gainsboro' Road Board School; Robert F. Beck, Douglas, Tynwald Street Board School; Charles William Coney, Wanstead, Downsell Road Board School; Frederick W. Downing, Beccles Board School; Frederick J. Drayton, Ely National Schools; Miles W. Duffill, Hoxton, Wellington Street Board School; William C. Ennis, Hull, Chiltern Street Board School; William A. Hubbuck, Ecclesfield, Wincobank Board School; Frederick M. Reid, Bridport General Boys. (*Females*)—Bessie Abadi, Hatcham, Monsom Road Board School; Maria F. Bollom, Stella, St. Cuthbert's National Schools; Winifred Hindshaw, Pendleton, Broughton Road Board School; Elizabeth D. King, Tynemouth, Western Board Schools; Christina M. McEwen, Rhyl, Christ Church Board School; Mary J. Maher, Poplar, Upper North Street Board Schools; Mary B. Midgley, Keighley, North Village Infant Board Schools; Mary S. Rae, Battersea, Gideon Road Board Schools; Bessie W. Seward, Bridgwater, Girls' and Infants' National Schools; Maud Talbot, Pendleton, St. George's, Wellington Street Board Schools. CERTIFICATES (*Males*)—Charles E. Arnold, New Fletton

Board Schools; Edwin A. Bell, Newbury National Schools; John W. Bryant, Consett Board Schools; Daniell G. Cooke, Bristol Temple, Colston Church Schools; John T. Fletcher, Eckington Board School; William Hackett, Huddersfield, St. Andrew's Church Schools; Edwin A. A. Jones, Maidenhead National Schools; Frederick Pritchard, Loughborough, Cobden Street Board School; Ambrose Trenouth, Devonport, Morice Town Board School; Stephen Wiseman, Escombe Church School. (*Females*)—Margaretta Atkinson, South Shields, St. John's Higher Grade Schools; Emily Chirgwin, Swindon, College Street Board School; Euphemia H. Daniells, Highbury, Gillespie Road Board Schools; Jessie Grime, Manchester, Ducie Avenue Board School; Margaret A. Jacobsen, Liverpool, Pleasant Street Board School; Matilda E. Marshall, South Wimbledon, Trinity; Frances H. Pierrepont, Nottingham, Trinity National School; Florence S. Thomson, Goswell Road, Moreland Street Board School; Stella Westaway, Stoke Damerel Board School; Elsie M. Whitworth, Croydon Board School. The following names have been forwarded by the Scotch Education Department, as those of the candidates for Queen's Scholarships who obtained the highest number of marks for Geography at the examination of July, 1894: *Males*—(1) William A. Edward, Glasgow, Overnewton; (2) James Flett, Drainie, Lossiemouth; (3) Edward Blades, Bathgate, Armadale; (4) John Lardlow, Jedburgh, Grammar School. *Females*—(1) Mary A. McArthur, Govan, Greenhill; (2) Elizabeth Young, Haddington, Premney; (3) Minnie C. Reddock, Fordyce, Portsoy; (4) Joan N. Brown, Edinburgh, Normal F. C.

EUROPE.

The Hegemony of Europe.—In an article contributed to *La Société Nouvelle*, and printed separately in pamphlet form, M. Reclus traces briefly the causes which have given to Europe its present preponderating *rôle* in the advance of civilization, and discusses the question whether the foremost place is likely to be retained in the future. Having noticed the differences in form and relief, which have favoured Europe in contrast to Asia and Africa, the writer points out the special advantages of position, etc., which enabled Greece and Rome in turn to take the lead in the march of progress, and shows how the historic routes between the Mediterranean and North-West Europe (notably that along the valley of the Rhone) helped forward the extension of civilizing influences to the wider world bordering on the ocean, until at the present day the centre of energy, which radiates over the rest of the world, has shifted to England, whose language promises to become the universal medium of communication among the nations. Europe, though she originally received her civilization from the East, has kept the first place for over two thousand years; will she, asks M. Reclus, in her turn be disinherited? To this question he does not hesitate to reply in the negative, pointing out that the movements of civilization do not now follow merely one or more lines of least resistance, but extend their influence from one extremity of the world to the other, the horizon having gradually extended until it embraces the whole of our planet. The industrial competition of the countries which are now participating in the life of Europe, need not be fatal to her, so long as she makes the best use of her own resources.

ASIA.

The Gohna Lake.—The following extract from a letter from Lieutenant Guy Lubbock, R.E., has been kindly forwarded by his father, Mr. F. Lubbock: "Gohna, August 26, 1894.—The great catastrophe is just over; only, unfortunately, it came off between 12 and 2 a.m. last night. The water had just reached the top of the dam at five yesterday morning, and about six, Crookshank cut away a little bank we had made to prevent it overtopping at night, and the water began to trickle over. We watched the overflow getting larger and larger, with great excitement; but for about six or seven hours nothing happened, although the dam had cracked badly on the lower side the day before. At about twelve we thought it prudent to leave the dam, and went to watch from the telegraph-office 1000 feet up the hillside. At about three the transformation scene began. By this time there was a large amount of water both running over and percolating through the dam, and suddenly a huge rent began appearing near the lower end, and slowly extending towards the lake. It was an uncanny sight to see a deep ravine, about 200 feet deep and 400 feet wide, slowly advancing as the earth at the head of it was continually falling in and being carried off by the stream, now growing stronger every hour, as the lake was still rising. We thought the burst was going to happen before our eyes; but at about four o'clock the mist came down, so that we could see nothing more; and I don't think the ravine did go much further that day. It was very annoying, as we were pretty certain it could not last all night. It actually went at about 11.30. However, as it was pitch dark, with a thick mist and rain, I didn't get out of bed. Crookshank went down to the slip; but as the whole thing was cracking and subsiding in the most alarming way, he very soon came back. As far as we could make out, it fell 25 feet in the first hour, and about 300 feet in the next hour, after which it remained stationary, and will remain so. The flood rose 160 feet at a place 20 miles down, and 50 or 60 feet at Srinagur, about 70 miles down. The latter place, the capital of British Garwhal, was quite obliterated. The change in the whole place next morning was wonderful. The cut in the dam was about a mile long, a quarter of a mile broad, and about 320 feet deep in the highest part. The buried village reappeared, covered with about three inches of mud. The hillside that had been under water all began falling in, and what with the dead trees and brown withered grass, the whole place presented a most desolate appearance, 'and smelt so—pah!'"

Mr. Theodore Bent's Expedition to Arabia.—Mr. and Mrs. Theodore Bent will leave England in November to undertake a new expedition in Southern Arabia. They will, on this occasion, start from Muskat (Oman), and make their way across Arabia to Aden. They will again be accompanied by Mr. Imam Sharif, the Indian surveyor, who did such excellent work on the journey to the Hadramut. As Mr. and Mrs. Bent expect to return to England about April, we shall probably be able to have an account of the expedition before the end of the session.

Dr. Sven Hedin in Central Asia.—The last news from Dr. Sven Hedin, received from the Russian military post Pamirski, is, that on September 8 he had returned there from his exploration of the Yashil-kul, and that in a few days he proposed to leave to conclude his exploration of the mountain group Mustagh-ata and its glaciers. During the summer he had explored no less than eleven great glaciers of the giant mountain, as well as Lake Yashil-kul, but he proposed to stay another six weeks in the same locality for further exploration. He also intended to spend the winter on the banks of Lob-nor, and later, to proceed, *viâ* Kashgar, to Tibet. The commander of the Pamir post, who forwarded the above information, adds that on September 6 and 7 they experienced the first snowstorms

on the Pamirs, and the temperature fell at night to −2° Celsius. The first attempts at sowing barley, radish, and turnips, on the Murghab, 27 miles below the post, at an altitude of 11,500 feet, have proved quite successful. As to wheat, it was not yet ripe, and required a fortnight of bright weather without too strong night frosts.

Colonel Holdich on the Route of Alexander the Great.—In the note on this subject in the October number, p. 360, the following corrections should be made: line 5, *for* Potala *read* Patala; line 10, *for* Luo Bela *read* Lus Bela; line 24, *for* Brahins *read* Brahuis; lines 30 and 31, *for* Arnan *read* Arrian.

Mr. Bent's Expedition to the Hadramut.—Mr. Bent regrets that inadvertently he stated that the naturalist of the expedition was sent out by the British Museum. He was sent out at the sole expense of Dr. J. Anderson, F.R.S.

AFRICA.

Surveys in the Northern Cameroons.—A new survey with watch and compass has lately been made of the route followed by Dr. Zintgraff, between Mundame, on the Mungo river, and the now abandoned station of Baliburg, by the brothers Conrau, of the Cameroons Hinterland commercial expedition. A short account of the route is given in the *Mitt. aus Deutschen Schutzgeb.* (vol. vii. part 2), accompanied by a map and critical note by Dr. R. Kiepert. The present survey is, in his opinion, more reliable than previous sketches have been, one of which, by Ehmann, of Dr. Zintgraff's expedition, he gives side by side with the new map for the sake of comparison. There is a considerable difference in the general direction of the route on the two sketches, Conrau giving it as first northerly, and then, after a sharp bend, almost easterly, while according to Ehmann it is more consistently north-easterly. The position of Baliburg, according to the former, agrees well with that adopted by Kiepert in his German Colonial Atlas, from a combination of Zintgraff's and Flegel's routes, a fact which lends it some support. Conrau also differs from Zintgraff in considering a more northerly stream as the upper course of the Calabar river, that so marked by the latter being considered by the former as a southern tributary, though he allows that the accounts given by the natives may be erroneous, owing to their ignorance of the course of streams where they flow through dense forest. He also gives both streams rather a north-west than a westerly course, though, as Dr. Kiepert remarks, they must soon bend round to the latter direction in order to reach the point attained by Beecroft. The Banyangs stand in trade-relations with the English factories on the Calabar, the Skiahas acting as intermediaries. The water-parting between the Mungo and Calabar rivers seems also a line of separation ethnologically, the palm-mat huts seen south of it giving place to the north to those with clay walls. On the plateaux of the Bali country, which succeed the forest region further south, the climate is healthy, and wheat would probably thrive, but the unhealthiness of the intervening country is a drawback. The potatoes introduced by Dr. Zintgraff are now zealously cultivated by the natives. While in the forest-land the villages are numerous but small, on the plateaux the tribes congregate in single large settlements.

The French Protectorate on the Ivory Coast.—M. Marcel Monnier, who accompanied Captain Binger on his journeys into the interior of the Ivory Coast of Guinea in 1891–1892, after the abortive attempt at a delimitation of the Anglo-French boundary in those regions, gives a general account of the country traversed in the *Annales de Geographie* (1894, p. 409). Although the first French acquisition on this coast was made as far back as 1842, it is only within recent years that any progress has been made with the development of the country, or the exploration of

the interior. A new era has lately been inaugurated by the erection of the Ivory Coast into a separate administration with Grand Bassam for its capital. The same system of lagoons, separated from the sea by a narrow bank of shingle thrown up by the Atlantic swell, which characterizes the rest of the coast of Guinea, is met with here also. The passage of the narrow channels by which they communicate with the sea is a matter of great difficulty when the waves are high. Behind the lagoons the primeval forest extends for a distance of 200 to 250 miles into the interior, broken only by the courses of streams, the Komoe, Bandama, etc., which form the only routes, with the exception of narrow rugged footpaths. To the north the forests gradually grow less dense, until the Sudan plateau is reached, having an altitude, according to recent observations, of 1000 to 1300 feet, in the vicinity of Kong (these figures are considerably less than those on Captain Binger's map). Here is an open country, with granitic or other rocks emerging from the surface, dense vegetation being seen only along the courses of streams. Large herds of cattle are met with in the neighbourhood of the villages. The inhabitants of the two regions are as distinct as their surroundings. The passive and superstitious Guinea negro of the forest zone gives place in the plateau region to the Mussulman Mande-Diula from the north, a hardy race of traders and cultivators, with regular towns in which the houses are of masonry, displaying great commercial and industrial activity. Kong is the trade centre of the whole southern Sudan, and contains at least 15,000 inhabitants. A view of the town, from a photograph by M. Monnier, is given with the article, but does not, he says, at all adequately represent the imposing nature of the reality. The inhabitants show none of the usual Mussulman fanaticism, and the writer builds great hopes on the assistance to be obtained from them in the development of the commerce of the country in the interests of the French, to whom they have proved exceedingly friendly. At present few European articles reach Kong, and, contrary to a generally received notion, the velvet, satin, etc., displayed by the mission were then seen for the first time. Some progress has already been made in the way of trade at Grand Bassam, five factories having lately been established, and M. Monnier predicts good results, from the great advantages of situation, etc., possessed by the colony. Besides one attempt at a coffee-plantation, cultivation has hitherto been hardly tried, want of labour being here, as elsewhere, the great obstacle.

The Health of Europeans on Mount Kilimanjaro.—While other recent writers have considered the question of the settlement of the slopes of Kilimanjaro from the point of view of the products likely to repay cultivation, Dr. Brehme, who has held the official position of doctor at the station of Marangu, approaches the subject on the side of the hygienic conditions (*Mitt. aus Deutschen Schutzgeb.* vol. vii. part 2). His remarks refer solely to the zone between 3280 and 7200 feet above the sea (principally on the southern, south-eastern, and south-western slopes), including little beyond the present upper and lower limits of cultivation, for while the general clearing of the forests above would be fraught with grave risks from a climatic point of view, the comparative scarcity of water in the lower bush-steppes makes them unsuitable for settlement on a large scale. Having pointed out the advantages of the zone in question derived from the composition of the soil (a mixture of decomposed volcanic rocks and vegetable mould), the distribution of the rainfall through the year, the abundant supply of streams for irrigation, and the gentle angle of slope, which is, however, sufficient to afford good drainage, the writer discusses first the occurrence of malarial fever in the cultivated zone, and comes to the conclusion, from his own experience both with natives and Europeans, that while endemic cases do undoubtedly occur, they are never of a serious type, and that this disease should here be no obstacle to settlement by Europeans. In

by far the greater number of cases the seeds of the malady have been acquired in the swampy districts at the foot of the mountain, the existence of which, and the length of time at present occupied in passing through them, are the greatest obstacles to the development of the mountain slopes by Europeans. From this point of view, if from no other, the construction of a railway is of the utmost importance. Diseases resulting from chill are much more formidable than malaria to the natives of the plains, when they exchange their dry, hot climate for the damp cold of the mountains, but with suitable clothing Europeans need suffer little in this way. Next in importance come diseases of the digestive organs, which also attack the natives more than Europeans, though the latter, it is true, suffer much from dysentery, owing often to the unavoidable use of preserved provisions. It is, therefore, of great importance to consider how a suitable supply of fresh food can be made available. The meat supply will be the greatest difficulty, as there is not a great area of pasture-land on the mountain. The needed vegetable diet will be more easily supplied, though at present there is little variety, and a better bread-material is greatly needed. The uneven ripening is the great obstacle to the cultivation of wheat, necessitating the daily gathering of the ripe ears for about a fortnight. Potatoes can be grown with the best result, and all sorts of garden vegetables. There is no difficulty in finding suitable sites for dwelling-houses, owing to the universally good drainage. Vegetation, however, should be kept under in their vicinity. With the erection of saw-mills, and better means of transport from the coast, the class of houses can be in time improved. It remains to be seen whether the stone houses built at Moshi will stand the test of earthquake shocks. Dr. Brehme considers that colonization by small cultivators is the most likely to prove successful.

A Visit to Lake Mweru.—From the station of Lofoi in the Garenganze country, east of the Lufira, Mr. Crawfurd, one of the missionaries settled there, has made two journeys across the Kundelungu plateau to Lake Mweru and its eastern shores, by routes considerably to the south of those of Sharpe and Stairs. Some details of geographical interest appear in his diary, which has been published in *Echoes of Service*, that dealing with his outward route on the second journey appearing in Part 1 for July of the present year (p. 162). The plateau was climbed at the head of the Kasanga valley, which runs eastwards from that of the Lufira. Near the eastern edge of the plateau, a visit was paid to the rock refugees of the Va-Lamotwa, whose retreat is so carefully concealed among the labyrinth of rocks that, without a clue, it would be impossible to discover it. The descent towards the lake forms two distinct steps, a lower plateau intervening between the highest ground and the level savannah in the neighbourhood of the shores. The latter is inundated during flood season, giving the lake a great extent south-westwards. Crossing the Lufukwe river, which flows to the lake, Mr. Crawfurd traversed the savannah in an easterly direction, and later on a strip of thin forest, reaching the lake apparently near its south-west corner, a line of low hills forming its immediate boundary. The shores appeared more diversified with bays and promontories than is shown on the maps. Boats having been procured from the Va-Shila or lake people, Mr. Crawfurd in two days crossed to the eastern side, skirting the southern shore, and passing the two mouths of the Luapula, the western, which alone bears that name, being found by measurement to be 592 yards wide, while the eastern (called Mifimbo) was treble that amount. (It should be noted that on Sharpe's map given in the *Journal*, vol. i. p. 576, only one mouth is marked, though earlier maps supposed two, divided by Kisi Island). The chief Shimba, on Kilwa Island to the north, has made himself much feared in these parts. East of the Luapula five good-sized islands were passed. The name Mweru, according to Mr. Crawfurd,

means "white," while Luapula denotes "great wave-lasher." On the way to the Kalungwizi station on the east shore he struck into the old route of Livingstone, whose map, he says, is thoroughly reliable. The settled government lately introduced seems generally welcomed by the inhabitants.

POLAR REGIONS.

The Peary Polar Expedition.—We learn, from information recently communicated to the *Times*, that the steamer *Falcon*, with the members of Lieutenant Peary's Polar expedition, arrived at St. John's, Newfoundland, on September 15. Lieutenant Peary himself, with two of his men, has remained in Greenland to continue his work of exploration for another year. Mr. Peary landed in Bowdoin Bay, in Inglefield Gulf, 35 miles north of M'Cormick Harbour, in August, 1893. On March 6, 1894, he started on his journey to Independence Bay, with eight men, twelve sledges, and ninety-two dogs. He advanced 134 miles in thirteen days across the inland ice, and an altitude of 5,500 feet was attained. The party met with bad weather almost from the outset; the hardships experienced surpassed all previous Arctic records. With the exception of one, however, all the members of the party escaped injury. The temperature was very low, the average approaching 40 degrees below zero, and the minimum recorded falling to 60 degrees below zero Fahrenheit. These conditions were enormously aggravated by long-continued gales of wind. Owing to the loss of many of the dogs, a section of the expedition was left behind, and Lieutenant Peary with three others pushed on for fourteen days more, but in that time they only succeeded in covering eighty-five miles. In the end the party were compelled to turn back, after making only one-fourth of the distance to Independence Bay. The sledges had to be abandoned, and only twenty-six dogs of the ninety-two returned alive. The head-quarters at Bowdoin Bay were reached on April 18. The rest of the summer was employed in exploring the regions in the nighbourhood of the Bay. The *Falcon*, on its return journey to Bowdoin Bay from St. John's to bring back the members of the expedition, called at Carey Island, in the hope of finding some trace of the Swedish naturalists, Björling and Kalstenius, who were wrecked there in the schooner *Ripple* in 1892, and also carefully examined Clarence Head and Cape Faraday. The search, however, proved without result, and it is consequently regarded as certain that both the explorers are dead. Although having failed in its primary object, the scientific results obtained by Peary's expedition this year are of an important and varied character. A large store of information on the subject of glacial geology has been collected, maps have been drawn up, and the deep-sea fishing from the *Falcon* in Jones's Sound has added greatly to the knowledge already possessed of the Arctic marine fauna. Mr. Astrup surveyed and mapped 150 miles of the shores of Melville Bay, which had hitherto been uncharted. Professor Chamberlin, of Chicago University, who went out this summer in the *Falcon*, carefully studied the seventeen glaciers at Inglefield Gulf and others at Disco, and he considers that the region is an unequalled field for glacial study, because of the variety of glacial forms and the free exposure of structure. Nearly all the Greenland glaciers are tongues from the internal ice-cap, and terminate in vertical faces from 100 feet to 1000 feet high, presenting facilities for investigation which are not found elsewhere. The vertical faces reveal pronounced stratification of the basal ice, even the rocky and earthy materials carried in the bases of the ice being arranged in layers. Fine laminations were seen, twelve or twenty to an inch. The layers are sometimes twisted and contorted, and even thrust over each other. The glacier movement at the ice border varies from a foot per day to a foot per week. The rocks in Inglefield

Gulf are mostly of the Archæan age and crystalline, with dykes of igneous rocks. The most interesting over-ice journeys were made by Lieutenant Peary and his wife, who travelled by sledge to Obrik Bay, and by Messrs. Entrikin and Vincent, who visited Littleton Island in the same manner.

Mr. Trevor-Battye on Kolguef Island.—Mr. Aubyn Trevor-Battye, accompanied by Mr. Hyland, a taxidermist, landed on Kolguef Island at the end of June, in order to spend the summer in studying and collecting the birds of the island. Mr. Powys, with whom they had gone out in the small steam-yacht *Saxon*, went on to Novaya Zemlya for some Arctic shooting, arranging to return to the east coast of Kolguef about the end of July. An accident to the engines necessitated a visit to Archangel, and entailed some delay. Early in August the *Saxon* arrived off the east coast of the island, but was prevented by heavy surf from landing, and proceeded to the more sheltered western side. Here a landing was made, and a letter found from Mr. Trevor-Battye, saying that he would be at Scharsk harbour, on the east coast, at the end of July. Mr. Powys, believing that some other opportunity for leaving the island might have presented itself to Mr. Trevor-Battye and his companion, returned to England. Subsequently Mr. Popham's yacht *Blencathra* went towards the island, but her captain did not consider it prudent to make any attempt to land, and no further news has been received. The Samoyedes who visit Kolguef in summer are in the habit of returning to the mainland in their open boats in September, and it is possible that the two Englishmen have accompanied them to their winter quarters at Pustozerk, on the Pechora. If this be so, some time must necessarily elapse before news can reach Archangel, as travelling in those latitudes is only practicable after sufficient snow has fallen to make sledging possible. Mr. Trevor-Battye's brother, Captain Battye-Trevor, proposes to start a small relief expedition to visit Kolguef and ascertain definitely what has occurred.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

The Marine Survey of India.—The Administration Report of the Marine Survey of India for the official year 1893–94 records good progress in the work of charting various parts of the coast. At the date of the previous report the survey of the Coromandel coast had been completed as far as Pumair, and was being carried down towards Armeghon shoal. This work was interrupted by the weather, which put a stop to boat-sounding, and the opportunity was taken advantage of to revisit the coast to the northward and fill up gaps in the ship's soundings as far as Chapalmundi. Early in April the *Investigator* returned to Kistnapatam, where the interruption occurred, and completed the survey to Shallingar shoal. It was found that the coast near Kistna, which is composed of sand and fronted by sandhills, gave evidence of considerable changes during each monsoon. On returning to Bombay for recess, the *Investigator* despatched an officer on H.M.S. *Marathon* to survey the Seychelle bank, in connection with the cables which have since been laid between Zanzibar and Seychelles, and Seychelles and Mauritius. Sea-work was begun again in October, with a sketch survey of the Aukretta group of the Laccadives. A detailed survey of the Suheli-Par reef, the most southerly point of the Laccadives, was next made, and a bank with 119 fathoms was found north-east from Minikoi in the direction of a reef reported by the *Noord Braband*. No less depth was observed, and the breakers reported by the *Noord Braband* were probably the tide rips caused by the bank. Between Minikoi and the Maldives soundings were taken 20 miles apart, the depth nowhere exceeding 1100 fathoms, being less than on either side of the line followed. It seems probable that the Maldives and Laccadives are connected by a submarine ridge. The *Investigator* next proceeded to

Colombo, and on the voyage thence to Madras encountered a 4-knot current setting to the southward off the south-east coast of Ceylon. The survey of the Madras coast was then completed with the co-operation of the *Naucowry*, and the two vessels began the survey of Palk Strait at Point Pedro. The scientific work of Surgeon-Naturalist R. Anderson was unfortunately much interrupted by medical duties. It is important to note that the specimens of the bottom brought up on a previous occasion to the west of the Laccadives have not been found to justify the assumption of submarine volcanic action in that region. Opportunity was this year taken to visit as many of the Laccadives as possible, and collections of both shore and reef fauna have been sent to the Calcutta Museum. Dredgings were also made inside the lagoon of the northern Maldive atoll, but with disappointing results. Some interesting notes are given regarding the coral formations on the south side of Palk Strait. The shores are for the most part coral sand, with a fringing reef about 100 yards from high-water mark. A coral cliff 1 to 12 feet high backs the strand at parts of the coast, which Dr. Anderson believes has an origin similar to that assigned by Agassiz to similar cliffs forming the seaward boundary of Florida Keys. The various dredgings made by the *Investigator* in deep water, yielded several new specimens of considerable zoological interest.

The Currents of the Bay of Biscay.—M. Hautreux contributes to No. 14 of the current volume of the *Bulletin de la Société de Géographie Commercial de Bordeaux*, a continuation and completion of his researches on the currents of the Bay of Biscay. The methods employed are those already described in the April number of the *Journal*, but the observations extend over a whole year, from the end of May, 1893. The number of floats thrown overboard during the year was 161, and of these 64 were recovered; the probable courses are plotted on a chart, and compared with what it must be admitted is a somewhat loose-jointed discussion of the winds at Biarritz, Arcachon, and La Coubre. The results, however, show clearly enough that the circulation of the surface water is entirely under the control of the winds. The largest proportion of floats reach the shore during summer, when the winds tend to blow from the sea; and the extra heating of the land in the Landes region exercises so marked an influence on the wind, that nearly everything comes ashore on the Gascon coast, and almost nothing on the coast of Spain or of Brittany. In winter when the winds are off shore, few floating objects reach the land; the tendency is to move eastwards to opposite Arcachon, and thereafter to turn northwards and southwards along the coast, following an indefinite more or less circular course. In no case is there evidence of an oceanic current entering from the open sea. In the centre of the bay the average rate of motion of the bottles was 5 to 6 miles in 24 hours; near the coast the average was only 2 to 3 miles.

GENERAL.

Death of Mr. William Topley, F.R.S.—It is with much regret that we record the death of Mr. William Topley, F.R.S., the Society's instructor in geology. He had been for upwards of thirty years an officer of the Geological Survey. Soon after leaving the Royal School of Mines in 1861, he became attached to the survey, working first among the Cretaceous strata of the south-east of England, and afterwards among the Carboniferous rocks of the Northumberland coal-field. His chief literary work was the well-known monograph on the Weald, published as a survey memoir in 1875. He also contributed many papers of considerable merit to the Geological Society, the Geologist's Association, the Anthropological Institute, and the Society of Arts. Mr. Topley was an authority on water questions and on agricultural geology. When the International Geological Congress met in London in

1888, he was one of the local secretaries, and the last scientific event of his life was a visit to the Zürich meeting of this body at the end of last August. During an excursion to Algiers, immediately after the meeting, he was seized with an attack of gastritis, which, on his return home, proved fatal. Mr. Topley was but fifty-three years of age, and at the time of his death had much scientific work in hand, which it is feared is not sufficiently advanced for publication.

Death of the Rev. J. A. Wylie.—The Rev. J. A. Wylie, of whose brutal murder in Newchang most of our readers have heard, was a promising young missionary, whose interest in travel and geography was shown in the narrative of a journey made by him in Central Manchuria, published in the *Geographical Journal*, vol. ii., 1893, p. 443. His sad death is a loss not only to his church, but to geography.

OBITUARY.

Admiral Sir Edward Inglefield, K.C.B., D.C.L., F.R.S.

Sir Edward Inglefield, whose name stands in the farthest north of our Arctic maps, died on September 5. Whilst his services to Geography in the Arctic regions must always be remembered as his most lasting work, he had a long and distinguished career as a naval officer in active service both before and after his voyages in high latitudes. He was born in 1820 at Cheltenham, his father and his maternal grandfather having both been admirals, and educated at the Royal Naval College, Portsmouth. He took part in the naval operations in the Levant in 1840 and previous years, had some experience of marine surveying in the Malay archipelago, and won his rank as commander by gallant conduct on the coast of South America in 1845. His Arctic experience commenced in 1852 with a private expedition in the yacht *Isabel*, a little vessel of 150 tons, to Smith's Sound and Jones Sound in search of Sir John Franklin. Although his subsequent expeditions were in ships of considerable size, he stated at the meeting of the Society, when Dr. Nansen read a paper on his proposed expedition in the *Fram*, that had he to go out again he would choose the smallest vessel. He reported, as the result of his first expedition, the existence of open water within Smith's Sound. On his return he received the gold medal of the Royal Geographical Society, and became a Fellow. In 1853 he was sent out on board the *Phœnix*, with two other vessels, to the relief of Sir Edward Belcher's expedition in Wellington Channel. In the following year he was sent out again on a similar mission, and brought back the crews of several of the vessels of Belcher's squadron, which were abandoned in the ice. This was the last effort made by the Admiralty in the search for Sir John Franklin. Captain Inglefield passed immediately into active naval service, taking part in the siege of Sebastopol and other operations in the Crimean war. In 1869 he was promoted to flag-rank, and for the next sixteen years he held a series of important commands and appointments. Sir Edward was nominated C.B. (Military Division) in 1869; a Civil Knight in 1877; and K.C.B. in 1887. He was a member of the R.G.S. Council for three years, and to the end took a keen interest in Arctic exploration. He wrote a book entitled 'A Summer Search for Sir John Franklin,' and a number of papers on naval and scientific subjects, and he will be remembered for a number of practical inventions relating to the equipment of war-vessels. He was also an artist of more than average merit.

Sir Edward was twice married.

CORRESPONDENCE.

Ascent of the Takht-i-Suliman.

Camp *viâ* Fort Sandeman, Zhob, Baluchistan, August 8, 1894.

Some remarks which I happened to see a short while ago in one of the monthly magazines on the subject of the Takht-i-Suliman, were calculated to lead one to suppose that the summit of that mountain has never yet been reached by a European. The name of this mountain is so well known from its mythical, geographical, and ethnological associations, that it may interest some of the readers of the *Geographical Journal*, to know that its summit has been reached by Europeans.

This mountain, which, with its sister peak of Kaisaghar, form the highest points of the Suliman range of the north-west frontier of India, is situated in the territory of the Sheranis, who, until brought under British control in the winter of 1890, were an independent and extremely troublesome border tribe. Many legends attach to it. According to some, Noah's Ark alighted here after the Deluge; while others (from this the mountain derives its name) connect it with Solomon, who, as the story goes, once came to Hindostan to marry a lady named Balkis. While returning from India with his bride in a flying throne, the lady requested Solomon to stop for awhile, to enable her to take a last fond look at her native land. Thereupon the throne alighted on this peak, which has ever since borne the name of Takht-i-Suliman, or Solomon's Throne. Ethnologically, the mountain is considered by some to have been the birthplace of the Pushta-speaking races.

From these and other legends connected with this mountain, the shrine situated near its summit has been for many centuries the place of pilgrimage of such adventurous pilgrims, both Hindu and Mohammedan, as were hardy enough to face the dangers of the road, through the wild tribes of the country, and the difficulties of the mountain itself. A native surveyor is said to have reached the shrine about a hundred years ago, while somewhat later two Englishmen, Messrs. Fraser and Harris, members of Elphinstone's Mission of 1809, are said to have attempted the ascent, without success. The military expedition sent to survey this mountain in 1884 succeeded in reaching the summit of the Kaisaghar peak close by, which is 11,300 feet, and some 200 feet higher than the peak of the Takht itself. No attempt was made to scale the Takht, which was said to be inaccessible.

During the Sherani expedition in December, 1890, General Sir George White, the present Commander-in-chief of India, in order to show the Sheranis that even their most remote mountain fastnesses were not inaccessible to British troops, ascended the mountain from the eastern side, accompanied by a small party of picked men, and succeeded, after some two days' hard climbing, in reaching a point on the east line of the hill, but was unable to devote the time necessary for an attempt to reach either the shrine or the actual summit.

Major MacIvor, C.I.E., then political agent at Zhob, and myself determined, the following year, to attempt the ascent, and found ourselves on June 28, 1891, at the Pezai spring, on the western slopes of the range—the highest point at which spring water on that side is obtainable. At dawn on the 29th we commenced the actual ascent, and by the evening, after a hard day's climb, reached the crest-line at the point where the famous shrine is situated. Here we found a couple of rough stone hut shelters erected by pilgrims, in which former visitors had each in turn left cooking-vessels and supplies of flour and rice for the use of them who might come after them. The actual shrine was close by, and within a few yards, but far from a pleasant place to get at. The face of the mountain at this point on the eastern side is a sheer precipice of many thousands of feet. The shrine is some 20 feet down

below the edge of the precipice, and consists of a small ledge of rock about 4½ feet long by 3 feet wide, with a slight artificial parapet of rocks on the outer sides, about a foot in height. It is reached by four foot-holes cut or worn away in the rock. The hand and foot-hold is good, but the edge of the precipice appears slightly to overhang the little ledge below, and the sensation therefore experienced in going down or coming up over the edge of the precipice is only equalled by that of seeing some one else do so. All pilgrims apparently do not enter this shrine, but content themselves with looking down into it from above. Those who do descend have a small token in the form of a small piece of stick, which they fix into the interstices of the little rock parapet. Both of us descended, and left our stick tokens. The look down into space from this little ledge does not tempt one to make a very long stay there.

The crest of the mountain at the shrine is not the highest point, which is at one of the three knob-like peaks at the south end of the crest. These we determined to ascend, if possible, next day, notwithstanding the assurances of our native guides that these peaks were quite inaccessible. After a cold night on the crest, on the ground, where some snow was still lying in patches, we commenced a hard day's work. Each of the three peaks before us was separated from the place in which we were and from each other by precipitous gaps in the crest-line, and the ascent certainly did not appear hopeful. Without describing the many adventures of the day, it will suffice to say that we both succeeded in reaching the tops of all three peaks, and also, I am glad to say, in discovering a possible way down again—a matter which at one time appeared somewhat doubtful.

This is the first occasion on which Europeans have reached either the shrine or the summit of the peak of the Takht-i-Suliman. No one has, as far as I know, gone up to either place since.

A. H. McMahon, Captain,
British Joint Commissioner, Afghan-Baluchistan Boundary Commission.

Mr. Seton-Karr on the Position of Mount St. Elias.

The following telegram was published in the *Times* of the issues of September 14 (2nd edit.) and September 15, 1894 :—

"Canada-Alaska Boundary Survey have completed their labours. One most important result has been the discovery that Mount Elias, long regarded as the highest peak on the continent, is situated on British territory. The extreme altitude of Mount Elias has been found to be 18,023 feet; but Mount Logan, which is also in British territory, reaches 19,534 feet."

I wish to draw attention to this, as it confirms the position maintained by me in *Proceedings* R.G.S., January, 1887, p. 52, and May, 1887, p. 272; July, 1889, p. 433; November, 1889, p. 684.

H. W. Seton-Karr.

Captain Larsen's Antarctic Journal.

Great Marlow, Bucks, October 11, 1894.

On the translation of Captain Larsen's paper in the *Journal* (p. 333, etc.) on the voyage of the *Jason* to the Antarctic, I venture to send the following few notes :—

P. 333. *Fiskesel.* Should be *-sæl.* This name is not used, so far as I am aware, for any northern species.

Cement, probably "kalk" = lime?

A quarter of a Norwegian mile. A sailor's mile is usually the *sea* mile = 4 English, not the Norwegian land mile = over 7 English.

Petrified worms in *petrified wood.* Perhaps *Teredo?* which would show the wood *had* been "thrown out of water."

P. 335. *Graasel* (= -sæl) is one of the names for the northern Grey Seal (*Halichœrus grypus*).

Blue whale (*Blaathvalen*). Should be *Blaahvale*, Sibbald's Rorqual, or Blue Whale (*Balœnoptera Sibbaldi*, Gray).

P. 336. *Finhwale* (should be *Finhvale*) = Finwhales, or *Balœnopteridæ*.

Knarhval = the Humpback (*Megaptera boöps*, Fabr.).

Rethvalen. Should be *Rethvale* = Right Whales (*Balœna*).

P. 338. *Minkeval.* Should be *Minkehvale* = plural. I think this is the lesser Rorqual (*Balœnoptera rostrata*, Fabr.), but forget at this moment for certain. It is either that species or *B. borealis*, Rudolphi's Rorqual.

Kongepenguinerne. Means "the king penguins," which is the English name for *Aptenodytes pennanti*, Gray, but I am not aware that any species is called *Emperor* penguin?

P. 339. *Same species as . . . Graamaage, or Havhest.* Graamaage simply means "grey gulls." Havhest is the Fulmar petrel (*Procellaria glacialis*, L.).

Veier Öen. Should be Vejr Öen.

P. 340. For *Svend Foyn*, see *Zoologist* for 1884, p. 366, and following years.

P. 341. *Kvitting* (*whiting*) = Hvitting, more correctly Hvidling.

P. 342. Skjær = skerries.

ALFRED HENEAGE COCKS.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.	Mag. = Magazine.
Ann. = Annals, Annales, Annalen.	P. = Proceedings.
B. = Bulletin, Bollettino, Boletim.	R. = Royal.
Com. = Commerce, Commercial.	Rev. = Review, Revue, Revista.
C. R. = Comptes Rendus.	S. = Society, Société, Selskab.
Erdk. = Erdkunde.	Sitzb. = Sitzungsbericht.
G. = Geography, Geographie, Geografia.	T. = Transactions.
Ges. = Gesellschaft.	V. = Verein.
I. = Institute, Institution.	Verh. = Verhandlungen.
J. = Journal.	W. = Wissenschaft, and compounds.
M. = Mitteilungen.	Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Alps—Schwemser-Ferner. *Globus* **66** (1894): 229–233. **Greim.**

Der Ausbruch des Schwemser-Ferners (Oetzthaler-Alpen) am 9 Juli, 1891. Von Dr. G. Greim.

An account and discussion of the bursting of the glacier-lake in the Schnalserthal, with a map and illustration.

Belgium and Holland. **Baedeker.**

Belgium and Holland, including the Grand-Duchy of Luxembourg. Handbook for Travellers. By K. Baedeker. With 13 maps and 21 plans. Eleventh Edition. Leipsic, Karl Baedeker; London, Dulau & Co., 1893. Size 6½ × 4½, pp. lxii. and 423. *Price* 6 *marks. Presented by Messrs. Dulau & Co.*

British Islands—Tide-tables. **Harris.**

Tide-tables for the British and Irish ports for the year 1895. Computed by Captain H. R. Harris, R.N. London. Printed for the Hydrographic Department, Admiralty [1894]. *Price* 1*s.* 6*d. Presented by the Hydrographer.*

England—Derbyshire. **Baddeley.**

Thorough Guide Series. The Peak District of Derbyshire and neighbouring Counties. By Mr. J. B. Baddeley. Ten Maps, General and Sectional (adapted from the Ordnance Survey), by Bartholomew. Sixth Edition. London, Dulau & Co., 1894. Size 6½ × 4½, pp. xxiv. and 158. *Price* 3*s. Presented by the Publishers.*

England—Thames. *Natural Science* **5** (1894): 97–109. **Gregory.**

The Evolution of the Thames. By J. W. Gregory, D.Sc.

A criticism of Professor Prestwich's views on the geological history of south-eastern England.

France—Ardennes. *Tour du Monde* **68** (1894): 161–192. **Rayeur.**

A travers l'Ardenne française. Par M. L.-A. Rayeur.

This interesting little paper gives a picturesque account of a trip along the Meuse, contrasting the busy commercial towns and villages which turn the valley of the Meuse into "a street 60 miles long" with the lonely woods of the neighbouring plateau.

France—Landes. *B.S.G. Comm. Bordeaux* **17** (1894): 401–411. **Hautreux.**

Côtes des Landes; vents et courants. Par A. Hautreux.

A continuation of the author's previous researches, which is noticed in the Monthly Record.

France—Lyons. ——

Lyon et la Région lyonnaise. Etudes et Documents publiés à l'occasion du XVe. Congrès des Sociétés Françaises de Géographie, en 1894. Lyon, 1894. Size 10 × 7, pp. lxvi. and 152. *Presented by the Société de Géographie de Lyon.*

This handsome memorial of the meeting of the Congress of French Geographical Societies at Lyons is due to the enterprise of the Geographical Society of that town. It commences with a valuable epitome of the geography of the region, by Professor Gallois, with a map. Then follow special notices of particular subjects, including the history and topography of ancient Lyons by M. A. Bleton, the climate of Lyons by M. Ch. André, and a detailed account by various writers of the agriculture of the department of the Rhone and of the industries of the principal towns of the district, including the manufactures of silk and other textiles, and the special manufactures of Saint-Etienne, Saint-Chaumond, and other towns. Chapters on the systems of communication by water and by rail, and medical and statistical summaries, complete the volume.

Germany—Bavaria. **Günther.**

Glazial- und Drifthypothese auf bayerischem Boden erstanden. Von Siegmund Günther. Separatabd. a. d. Jahresb. d. Geograph. Ges. in München, 1894. Size 9½ × 6½. *Presented by the Author.*

Great Britain. **Baedeker**

Great Britain. Handbook for Travellers. By K. Baedeker. With 16 maps, 30 Plans, and a Panorama. Third Edition. Leipsic, Karl Baedeker; London, Dulau & Co., 1894. Size 6½ × 4½, pp. lxiv. and 547. *Price* 10 *marks. Presented by Messrs. Dulau & Co.*

In the present edition the section devoted to Scotland, although still considerably condensed, has been extended and improved.

Greece. *Z. Ges. Erdk. Berlin* **29** (1894): 260–270. **Galle.**

Dr. A. Philippson's Höhenmessungen in Nord- und Mittel-Griechenland und Türkisch-Epirus im Jahr 1893. Berechnet von A. Galle.

Describes the method of calculating aneroid observations, and gives lists of reduced altitudes for a large number of stations in northern Greece.

Hungary—Budapest. **Thirring and Körösi.**

Geschichte des Statistischen Bureaus der Haupt- und Residenzstadt Budapest, 1869–1894, von Dr. Gustav Thirring. Berlin, Puttkammer und Mühlbrecht, 1894. Size 9 × 6¼, pp. 42.

Die Hauptstadt Budapest im Jahre, 1891. Resultate der Volksbeschreibung und Volkszählung von Josef Körösi, und Dr. Gustav Thirring. Erster Band. Berlin, Puttkammer und Mühlbrecht, 1894. Size 11 × 7½, pp. 98 and *120. *Price* 5*m*. *With Maps and Tables. Presented by the Statistical Bureau of Budapest.*

Italy—Small Lakes. *Riv. G. Italiana* **1** (1894): 487–492. **Crotta.**

Profili batometrici dei laghi Briantei e del lago del Segrino (Vall' Assina Meridionale) Per il dott. Salvatore Crotta.

A plate is given showing the outline, and two or three profiles showing the depths, of these small lakes, the largest of which, Lago Annone, is only 2½ miles long. The names of the lakes dealt with are—Montorfano, Alserio, Pusiano, Annone, Segrino, and Sartirana.

The same number of the *Rivista* contains, on pp. 521–526, a long abstract of a paper by Olinto Marinelli on the Lakes of Cavazzo, from the *Bollettino* of the Italian Geographical Society, referring to Lakes Cavazzo, Alleghe, Levico, Caldonazzo, Toblino, Torel, Molveno, Cavedine, Ledro, and Garda; also on pp. 526–527 an abstract of a paper on the lakes of the moraine amphitheatre of Ivrea, by De Agostini, published in the *Atti* of the Academy of Sciences of Turin 29 (1894), 16, dealing with the following lakes: Vivarone, Candia, Sirio, Nero, Campagna, Pistono, Alice, Bertignano, S. Michele, Maglione, Meugliano, and Monerivello. Also on pp. 528–529 there are abstracts of two papers by Pero on the small alpine lakes of Valtellini, describing their colour, but not their depth.

Italy—Udine. *Globus* **66** (1894): 165–168. **Halbfass.**

Die deutsche Sprachinsel Zahre-Sauris in Friaul. Von Dr. Halbfass. Neuhaldensleben.

Dr. Halbfass describes a visit to one of the few Italian districts where a dialect of German is still spoken by the people, although Italian prevails all round them. This is a direct survival of the time when north-eastern Italy formed part of the German Empire.

Italy—Venice. **Wiel.**

Venice. By Alethea Wiel. (The Story of the Nations Series.) London, T. Fisher Unwin, 1894. Size 8 × 5½, pp. xxxiii. and 478. *Plan and Illustrations. Price* 5*s*. *Presented by the Publisher.*

A very readable epitome of the tangled history of Venice, well illustrated with serviceable maps and carefully selected reproductions of photographs and pictures.

Russia—Black Sea Coast. **Radde and Koenig.**

Das Ostufer des Pontus und seine kulturelle Entwickelung im Verlaufe der letzten dreissig Jahre. Vorläufiger Bericht über die Reisen im kolchischen Tieflande, Adsharien, am Ostufer des Schwarzen Meeres, am Unterlaufe des Kuban und über die Durchquerung der Hauptkette von Psebai nach Sotschi im Sommer 1893. Von Dr. G. Radde und E. Koenig. Mit zwei Karten. Ergänzungsheft No. 112 zu 'Petermanns Mitteilungen.' Gotha, Justus Perthes, 1894. Size 11 × 7½, pp. 120. *Price* 6 *mark* 40.

The main features of this memoir will be summarized in the Monthly Record.

ASIA.

Central Asia—Pamirs. **d'Alviella.**

Les Anglais, les Russes et les Chinois sur le Toit du Monde. Conférence donneé à la "Société royale belge de Géographie." Par le Comte Goblet d'Alviella. Brussels, 1894. Size 9 × 6¼, pp. 30. *Map. Presented by the Author.*

India—Historical. **Holdich.**

A Retreat from India. A lecture delivered by Colonel Holdich, R.E., in the United Service Institution of India, on June 7, 1894. Size 10 × 6. From the *Journal* of the United Service Institution of India, vol. 23 (1894), pp. 112–128.

Colonel Holdich traces the route of Alexander the Great in his retreat from India from personal study of the Greek relics found along the line of march. A note on this lecture appeared in the *Journal* for October.

India—Resources. **Watt.**

Memorandum on the Resources of British India. By George Watt, M.B. Calcutta, 1894. Size 9½ × 6, pp. 80.

A most valuable and authoritative summary of the natural wealth of the Indian empire, collected from the latest statistics.

Sikkim. **Louis.**

The Gates of Thibet. A Bird's Eye View of Independent Sikkim, British Bhootan, and the Dooars as a Doorga Poojah Trip. By J. A. H. Louis. Calcutta, the Catholic Orphan Press, 1894. Size 10 × 6½, pp. 183. *Map and Illustrations. Presented by the Author.*

The author, along with Mr. Jambon, penetrated through Sikkim as far as Tumlong and Jelapla, and made many interesting observations on the country and people. The copy presented to the Society is enriched by a number of photographic illustrations, in addition to those appearing in the published book.

Tibetan Orthography. *J. Asiatic S. Bengal* **63** (1894): 4–20. **Shawe.**

On the relationship between Tibetan orthography and the original pronunciation of the language. By the Rev. F. B. Shawe, Moravian missionary in Ladak.

Turkey in Asia. **Cuinet.**

La Turquie d'Asie. Géographie administrative, statistique, descriptive et raisonnée de chaque province de l'Asie-mineure. Par Vital Cuinet. Tome 4, Fasc. 10. Paris, Ernest Leroux, 1894. Size 11½ × 7½, pp. 300.

This instalment of M. Cuinet's great work deals exhaustively with the vilayet of Brussa.

AFRICA.

Africa. **Brown.**

The Story of Africa and its Explorers. By Robert Brown. Vol. III. The last of a long tale—the Sahara—the Missionaries—the Hunters—the International Explorers. London, Cassell and Co., 1894. Size 10½ × 8. *Illustrations. Presented by the Publishers.*

This volume deals with tropical Africa, and gives an account of a large number of the exploring journeys of the last twenty years, especially of those across the continent, and in the Sahara.

African Architecture. *J.R.I. British Architects* **1** (1894): 635–642. **Last.**

Notes on some African structures. By Mr. J. T. Last.

This paper is illustrated by a number of drawings and plans of houses and buildings constructed by the natives of East Africa.

British East Africa. **Ravenstein.**

Report on Meteorological Observations in British East Africa for 1893. By E. G. Ravenstein. Published by the Authority of the Directors of the Imperial British East Africa Company. London, George Philip and Son. Size 10 × 6½, pp. 12. *Price* 6*d. Presented by the Author.*

The observations summarized in this useful pamphlet were made at Chuyu, Mombasa, Malindi, Magarini, Lamu, Witu, Kismayu, on or near the coast, and at Machako's and Fort Smith in Kikuyu, and there are rainfall statistics from some additional stations in the Ibea Company's territory.

GENERAL.

Anthropology. **Peal.**

Fading Histories. By S. E Peal. Extract from the *Journal* of the Asiatic Society of Bengal. Vol. lxii. part iii. No. 1, 1894. Size 9 × 6½, pp. 12. *Presented by the Author.*

Anthropology. **Peal.**

The Communal Barracks of Primitive Races. By S. E. Peal. Extract from the *Journal* of the Asiatic Society of Bengal. Vol. lxi. part. iii. No. 3 for 1892. Size 9 × 6½, pp. 246–269. *Presented by the Author.*

Anthropology. **Brinton.**

The Congress of Anthropology. Address by the President. The "Nation" as an Element in Anthropology. By Dr. Daniel G. Brinton. Reprinted from the *Memoirs* of the International Congress of Anthropology. Size 9¾ × 6¾, pp. 34. *Presented by the Author.*

Architecture. **Fergusson.**

A History of Architecture in all countries, from the earliest times to the present day. By James Fergusson. In Five Volumes. Vols. i. and ii. Third Edition. Edited by R. Phené Spiers. London, John Murray, 1893. Size 9½ × 6½, pp. (vol. i.) xxxi. and 634; (vol. ii.) xiv. and 642. *Illustrations. Presented by Messrs. John and Hallam Murray.*

The present edition of this standard work has in part been rewritten in order to make necessary corrections, and the results of recent discoveries incorporated.

Bibliography. **Ellis and Elvey.**

Ellis and Elvey's General Catalogue of Rare Books and Manuscripts. London, 1894. Size 9½ × 6½, pp. 438. *Plates. Presented by the Publishers.*

Bibliography—Oriental. ———

Orientalische Bibliographie begründet von August Müller. . . . Bearbeitet von Dr. Lucian Scherman, herausgegeben von Dr. Ernst Kuhn. VII. Jahrgang. Erstes Halbjahrsheft. Berlin, Reuther und Reichard, 1894. Size 9 × 5½, pp. 157.

Biography. **Lee.**

Dictionary of National Biography. Edited by Sidney Lee. Vol. xxxix. Morehead—Myles. London, Smith, Elder & Co., 1894. Size 10 × 7, pp. vi. and 452. *Price* 15*s.*

The following names, more or less connected with geography and travel, are noticed in this volume: James Justinian Morier, by Stanley Lane-Poole; John Bacon Sawrey Morritt, by W. P. Courtney; Henry Nottidge Moseley, by B. B. Woodward; Joseph Moxon, by Professor J. K. Laughton; Joseph Mullens, by Captain S. P. Oliver; Peter Mundy, by W. P. Courtney; Sir Roderick Impey Murchison, by Professor Bonney; Hugh Murray, by G. Le Grys Norgate; George Chaworth Musters, by the late H. Manners Chichester; and Thomas Myers, by the Rev. J. H. Lupton.

Biography—Brackebusch. *Deutsche Rundschau G.* **17** (1894): 39–41. ———

Dr. Ludwig Brackebusch. *With portrait.*

Biography—Denisot. *Rev. G.* **36** (1894): 193–199. **Marcel.**

Gabriel Marcel: Le conte d'Alsinoys, géographe.

Nicolas Denisot, "conte d'Alsinoys," born in Mans in 1515, was a cartographer and clever designer as well as poet. This notice refers to some of his maps, one of which is reproduced. A separate copy of the memoir has been presented to the Library by the author.

Biography—Eck. **Günther.**

Johann Eck als Geograph. von Seigmund Günther. Forschungen zur Kultur- und Litteraturgeschichte Bayerns. Herausgegeben von Karl von Reinhardstöttner. Munich and Leipzig, G. Franz, 1894. Size 11 × 7½, pp. 24. *Presented by the Author.*

Biography—Khama. **Knight-Bruce.**

The Story of an African Chief: being the life of Khama. By Mrs. Wyndham Knight-Bruce, with a Preface by Edna Lyall. Second Edition. London, Kegan Paul & Co., 1894. Size 6½ × 4½, pp. viii. and 71.

Biography—Middendorf and Schrenk. **Wolkenhauer.**

Deutsche Rundschau G. **16** (1894): 471–474.

Leopold von Schrenck und Alexander von Middendorf. Von W. Wolkenhauer. *With Portraits.*

Biography—Ruspoli. *B.S.G. Italiana* **7** (1894): 308–327. **Keller and Ferrandi.**

Eugenio Ruspoli (1) Rimembranze del prof. dott. C. Keller. (2) Lettera del cap. Ugo Ferrandi al nob. ing. P. Vigoni.

Describing mainly the last journey of Prince Eugenio Ruspoli in Somaliland.

Biography—Uzielli. *Deutsche Rundschau G.* **16** (1894): 470–471. ———

Gustavo Uzielli. *With Portrait.*

Biography—Vespucci. **Markham**

The Letters of Amerigo Vespucci and other documents illustrative of his career. Translated, with Notes and an Introduction, by Clements R. Markham. London, the Hakluyt Society, 1894. Size 9 × 6, pp. xliv. and 121. *Presented by the Hakluyt Society.*

British Empire. ———

The Year-Book of the Imperial Institute of the United Kingdom, the Colonies, and India, 1894. A Statistical Record of the Resources and Trade of the Colonial and Indian Possessions of the British Empire. Compiled chiefly from official sources. Third Issue. London, John Murray, 1894. Size 10 × 6½, pp. xv. and 888. *Maps, Charts, etc. Presented by the Executive Council of the Imperial Institute.*

In the preparation of this edition care has been taken to obtain official revision of the portions dealing with each colony. The whole work forms a voluminous and authoritative treatise on the commercial geography of the British Empire.

Church Missionary Society. ———

Proceedings of the Church Missionary Society for Africa and the East. Ninty-Fifth Year, 1893-94. London, Church Missionary House, 1894. Size 8½ × 6, pp. (lxxxviii.) 298 and (335). *Maps. Presented by the Church Missionary Society.*

Columbus. **Kayserling.**

Christopher Columbus and the participation of the Jews in the Spanish and Portuguese Discoveries. By Dr. M. Kayserling. Translated from the Author's manuscript . . . by Charles Gross, PH D. New York, Longmans & Co., 1894. Size 7½ × 5, pp. xv. and 189. *Price 5s. Presented by the Publishers.*

So many phases of the Columbus celebration have been noticed in these pages that we are not surprised now to find a book specially setting forth the services of Jews—who were usually renegades—in the great epoch of fifteenth-century discovery. It is hinted here that America was first sighted by a Jewish sailor whom the admiral cheated of 10,000 maravedis and a silk waistcoat. In any case, the reward paid to Columbus was taken from the confiscated estates of Spanish Jews.

Commercial Geography—Bananas. *Kew B.*, 1894 : 229-314. ———

A summary of information relating to "Bananas and Plantains," with descriptions of the species and principal varieties of Musa grown for use and ornament.

It is curious that so important and well-executed a compilation as this should be published anonymously.

Commercial Geography. **Noël.**

Histoire du Commerce du Monde depuis les temps les plus reculés, par Octave Noël. [II.] Depuis les Découvertes Maritimes du XV^e^ Siècle jusqu'a la Révolution de 1789. Paris, E. Plon, Nourrit & Co., 1894. Size 11½ × 8, pp. 446. *Maps and Plates.*

This is the second volume of Professor Noël's great work, and is intended to be followed shortly by a third, bringing the history down to the year 1860. The continuous history of maritime exploration which this volume contains is supplemented by a series of appendices containing translations of original documents. The illustrations, though few, are well chosen.

Division of the World. **Reclus.**

East and West. By Elisée Reclus. Size 10 × 6½, pp. [14]. From the *Contemporary Review, October*, 1894. *Presented by the Author.*

Early Man. **Piette.**

L'époque éburnéenne et les races humaines de la période glyptique, par Ed. Piette. Saint-Quentin, Charles Poette, 1894. Size 9½ × 6½, pp. 27. *Presented by the Author.*

Educational. **Kirchhoff.**

Erdkunde für Schulen nach den für Preussen gültigen Lehrzielen, von Alfred Kirchhoff. I. Teil: Unterstufe. II. Teil: Mittel- und Oberstufe. Zweite, verbesserte Auflage. Halle a. S., 1894. Size 9 × 6, pp. (I. Teil) iv. and 56, (II. Teil) vii. and 304. *Presented by the Author.*

In this new series of graduated school-books, Professor Kirchhoff succeeds admirably in selecting essential facts for consideration. Even more striking is the manner in which he has dispensed with the use of figures in giving statistics while preserving the conception of proportion and relative magnitudes. This is partly achieved by the use of numerous tables in the form of statistical diagrams, which appeal directly to the eye.

Educational. *Beiträge Methodik Erdk.* **1** (1894): 1–26. **Kirchhoff.**

Zu Professor Hirschfelds Vorschägen über Umgestaltung des erdkundlichen Unterrichts, von Dr. A. Kirchhoff.

Educational. *Beiträge Methodik Erdk.* **1** (1894): 46–156. **Lehmann.**

Zur Beschaffung des heimatskundlichen Unterrichtsmaterials von Dr. Richard Lehmann.

Educational. *Beiträge Methodik Erdk.* **1** (1894): 27–45. **Ule.**

Praktische geographische Uebungen an der Universität, von Dr. W. Ule.

The three papers named above appear in the occasional publication newly established by Dr. Lehmann for the treatment of the educational aspects of geography, and they will be dealt with in another part of the *Journal*.

Educational. ———

California State Series of School Text-Books, Advanced Geography. Compiled under the direction of the State Board of Education. Sacramento [1893]. Size 12½ × 10, pp. 149. *Maps and Illustrations.*

A combined atlas and illustrated geography, treating the world from the Californian centre. Many of the maps are clear but unacknowledged copies of the work of British cartographers.

Educational. *Educational R.* **7** (1894): 310–326; **8** (1894): 5–16. **Montefiore.**

The Fuller Study of Geography. By Arthur Montefiore.

Educational. *J. of Geology* **2** (1894): 66–100. **Davis.**

Physical Geography in the University. By Wm. M. Davis.

This is a paper of exceptional value which will form the subject of a special note.

Educational. ———

The Report of the Commissioners appointed to consider the Draft Charter for the proposed Gresham University in London, together with Dissentient and other Notes. Presented to both Houses of Parliament by Command of her Majesty. London, Eyre and Spottiswoode, 1894. Size 13 × 8½, pp. lxiv. *Price* 6*d*.

The recognition of Geography in the scheme for a teaching university in London is referred to in the May number, vol. iii. p. 429.

Ethnology. **Brinton.**

Ethnology. On various supposed relations between the American and Asian races. By D. G. Brinton. Size 9½ × 6½, pp. 12. Reprinted from the *Memoirs* of the International Congress of Anthropology. *Presented by the Author.*

French Colonies. **Petit.**

Organisation des Colonies Française et des Pays de Protectorat, par Edouard Petit. Préface de M. R. de Moüy. Tome Premier. Organisation politique, administrative et financière, Garde et défense des colonies. Paris, Berger-Levrault & Co., 1894. Size 10 × 6½, pp. xxxi. and 685. *Price* 12 *fr.*

A full discussion of the methods of French colonial government with regard to their relation to the mother-country and their internal administration in all its ramifications.

French Colonies. **Leseur.**

Publications du journal "Le Siècle." La Situation Coloniale de la France en Juin, 1894. Conférence faite à la Société d' Économie Industrielle et Commerciale le 8 Juin, 1894, par Félix Leseur. Paris, A. Challamel, 1894. Size 7 × 4½, pp. 48. *Presented by the Union Coloniale Française.*

Union Coloniale Française. Rapport de l'Exercice, 1893–1894. Banquet Colonial de 1894. Paris, A. Challamel. Size 9 × 5½, pp. 94.

Publications de l'Union Coloniale Française. No. 3. Avril 1894. Le Régime Commercial des Colonies Françaises. Paris, A. Challamel. Size 8 × 5½, pp. 130.

——— No. 4. Avril 1894. Manuel d'Hygiène Coloniale. Paris, A. Challamel. Size 9 × 5½, pp. 88.

——— No. 5. Juin 1894. Le Soudan Français, organisation et pénétration. Paris, A. Challamel. Size 7½ × 5, pp. 20.

——— No. 6. Juillet 1894. Le Régime Commercial de l'Indo-Chine Française (Annam et Tonkin). Évolution du Régime douanier. Paris, A. Challamel. Size 8 × 5½, pp. 262.

——— No. 7. Aout 1894. Le Port d'Haïphong accessible aux grands navires (Deux projets d'Études). Paris, A. Challamel. Size 8 × 5, pp. 20. *Map.*

Gazetteer. **De-Toni.**

Repertorium geographico-polyglottum un usum "Sylloges Algarum Omnium," curavit Dr. Hector De-Toni in R. Licæo "M. Foscarini" Venetiarum Scientariam Naturalium Professor. Padua, 1894. Size 10 × 7, pp. 8 and cexiv.

An alphabetical index of the place-names of all languages, with their Italian and classical equivalents.

General Geography. *Rev. G. Italiana* **1** (1884): 6–32. **Marinelli.**

Concetto e Limiti della Geografia. Prof. G. Marinelli.

This disquisition on the field of geography was delivered in November, 1892, as the inaugural discourse of the "Cesare Alfieri" Institute of Social Science at Florence.

General Geography. **Haug.**

Vergleichende Erdkunde und Alttestamentlich Geographische Weltgeschichte. Von H. Haug. *Text and Maps.* Gotha, *privately published,* 1894. Size 12½ × 10, pp. v. and 71.

This curious work deals with a number of relations which the author points out between the different continents with regard to their form and relief, and it is illustrated by some striking maps.

German Colonies. **Meinecke.**

Koloniales Jahrbuch. Herausgegeben von Gustav Meinecke. Sechster Jahrgang. Das Jahr, 1893. Berlin, Carl Heymann, 1894 Size 9½ × 6½, pp. 312. Siebentes Jahrgang Heft i–ii. Beitrage, etc., pp. 144.

In addition to full particulars regarding the German colonies, this issue contains papers by F. M. J. Lieben, on the prospects of tropical cultivation in East Africa and New Guinea, by Dr. Hans Schinz on the vegetation of South-West Africa, and on the work of Protestant and Catholic missions in the German protectorates, as well as a number of appropriate notes. The first two parts of the Year-Book for 1894 contain memoirs which will be noticed elsewhere.

Geographical Society of Munich. **Günther.**

Münchens Geographische Gesellschaft im Lichte der Zeitgeschichte. Von Siegmund Günther. Separatabdruck a.d. Jahresbericht der Geographischen Gesellschaft in München, 1894. Size 9½ × 6½, pp. 22. *Presented by the Author.*

Historical. **Gelcich.**

Zwei Auszüge aus einer Sammlung von Reise-beschreibungen aus dem XVI. Jahrhundert. Mitgetheilt von E. Gelcich.

Notes of a journey in 1533 from Venice to Constantinople, through Austria and the Balkan peninsula, and of a project for a Suez Canal in 1532, by Giovanni Venetiano, extracted by Herr Gelcich from a rare volume of travels published at Vienna in 1543.

Historical. **Green.**

Town Life in the Fifteenth Century. By Mrs. J. R. Green. 2 vols. London, Macmillan and Co., 1894. Size 9 × 6, pp. (vol. i.) xvi. and 439; (vol. ii.) vii. and 476. *Price* 32*s.*

This work throws much light on the origin and growth of towns, and is treated with due respect to the underlying geographical conditions.

Historical Maps. *Rev. G. Italiana* **1** (1894): 213–223. **Fiorini.**

Il Mappamondo di Leonardo da Vinci ed altre consimili mappe. Par M. Fiorini, Professore all' universita di Bologna.

Historical Maps. *Rev. G. Italiana* **1** (1894): 341–352. **Casanova.**

Carta nautica del Reinel di proprietà del bar. Giovanni Ricasoli-Firidolfi, descritta ed illustrata da Eugenio Casanova.

A separate copy of this paper has also been received, presented by the Author. It is illustrated by a reproduction of Reinel's chart.

Historical maps. *T.R.G.S. Australasia* (*Victoria*) **11** (1894): 26–40. **Collingridge.**

The fantastic islands of the Indian Ocean and of Australasia in the middle ages, and their significance in connection with the early cartography of Australasia. By George Collingridge. *Illustrations.*

Historical Southern Continent. **Rainaud.**

Le Continent Austral, hypothèses et découvertes, par Armand Rainaud. Paris, Armand Colin & Co., 1893. Size 10 × 6½, pp. 490. *Presented by the Author.*

An interesting historical study, showing the interactions of theory and exploration in the discovery of the geography of the southern hemisphere. The author appears to consider the existence of an Antarctic continent to be a delusion, supposing that only an archipelago lies under the southern ice.

Military Topography. *J.R. United Service I.* **38** (1894): 687–710. **Verner.**

Military Topography. By Major Willoughby Verner, Rifle Brigade. With discussion.

The author gives, as the main essentials of military topography, a study of the tactical value of ground, and the general use of maps. His lecture deals mainly with the conditions of rapid reconnaissance surveys and the use of the range-finder.

Navigation. ——

The International Code of Signals for the use of all nations. American Edition. Revised in the Hydrographic Office. Washington, 1894. Size 10½ × 7. *Plates. Presented by the U.S. Hydrographic Office.*

Orthography. ——

Rules of Orthography for Native Names of Persons and Places. Cairo, War Office Printing Press, 1894. Size 9½ × 6½, pp. 22.

Palestine Exploration. **Whitly.**

Who Originated the Palestine Exploration Fund? By Rev. John Irvine Whitly. [Reprinted from the *Kent Coast Times* of March 29, 1894.] Size 8 × 5½, pp. 8. *Presented by the Author.*

Population of World. *Church Missionary Intelligencer* **45** (1894): 721–730. **Keane.**

The World, population, races, languages, and religion. By Professor A. H. Keane.

This article was prepared a year ago to accompany a new edition of the 'Church Missionary Atlas,' the publication of which has been postponed. The summary according to religion gives roughly 500 million Christians and 1300 million non-Christians.

Sportsman's Handbook. **Ward.**

The Sportsman's Handbook to practical collecting, preserving, and artistic setting-up of Trophies and Specimens, to which is added a synoptical guide to the hunting-grounds of the world. By Rowland Ward. Seventh Edition. London, Rowland Ward & Co., 1894. Size 8 × 5, pp. xii. and 192. *Illustrations. Price 3s. 6d. Presented by the Publishers.*

This practical guide to the rudiments of taxidermy has proved in previous editions of great value to sportsmen and travellers in teaching them "first aid" in the treatment of skins, which might without it become valueless.

Technogeography. **Mason.**

Technogeography; or, the Relation of the Earth to the Industries of Mankind. By Otis Tufton Mason. From the *American Anthropologist* for April, 1894. Washington, 1894. Size 9½ × 6. *Presented by the Author.*

"By technogeography is meant the study of the relationship between the Earth and human arts and inventions."

Time-Reckoning. *Rev. G. Italiana* **1** (1894): 98–113. **Porro.**

L'Unificazione dell' Ora. Francesco Porro.

On International time-reckoning.

Topography. **Briant.**

The Art of Topography. By Mr. Rowland Briant. From the *Conference Nr., J. Camera Club* **8** (1894): 82-88.

The author maintains that "the chief essentials of a topographical photograph are that it shall reproduce as accurately and literally as possible the appearance of the locality indicated, exactly as it would impress the sightseer when he has had time to thoroughly look at it; so much being shown as could possibly be seen, so much but no more, the point of view being perfectly practical."

Vespucci. *B.S.R.G. Anvers* **19** (1894): 22-37. **Georlette.**

Améric Vespuce, dans l'histoire et dans la légende, traduction de M. F. A. Georlette.

An abstract of a work by J. M. Pereira da Silva, written in Portuguese and published in Brazil. The fame of Vespucci is shown to be mainly legendary.

NEW MAPS.

By J. Coles, *Map Curator*, R.G.S.

EUROPE.

Caucasus. **Radde.**

Karte des nordwestlichen Kaukasus zur Übersicht der Marschrouten Dr. Gustav Radde's im Jahre, 1893. Scale 1: 2,000,000 or 31 statute miles to an inch. Petermann's 'Geographische Mitteilungen.' Erganzungsheft, No. 112, Taf. 1.—Das gegenwärtige vorkommen des Wisents (Auer) im Kaukasus, 1893. Von Dr. G. Radde. Scale 1: 600,000 or 9·3 stat. miles to an inch. Petermann's 'Geographische Mitteilungen.' Ergänzungsheft, No. 112, Taf. 2. Justus Perthes, Gotha, 1894. *Presented by the Publisher.*

Denmark. **Danish General Staff.**

Generalstabens topografiske Kaart over Danmark. Scale 1: 40,000 or 1·5 inch to a stat. mile. Kalkograferet og graveret ved Generalstaben. Kjölsenhavn, 1894. Sheets: Aalborg, Svenstrup, Vestervig. *Presented by the Danish General Staff through H. E. the Danish Minister.*

England and Wales. **Ordnance Survey.**

Publications issued since September 8, 1894.

1-inch:—

ENGLAND AND WALES:—174, hills photozincographed in brown; 193, 196, 197, engraved in outline; 242, 258, hills engraved, **1s.** each.

6-inch—County Maps:—

ENGLAND AND WALES:—**Lancashire,** 74 S.E., 90 S.W., 100 S.W., 108 N.E., S.W., 113 N.W., 118 N.E.; **Yorkshire,** 231 N.E., 232 S.W., 245 N.W., 247 S.W., 272 N.E., **1s.** each.

25-inch—Parish Maps:—

ENGLAND AND WALES:—**Yorkshire,** VI. 4, **4s.**; VIA. 16, **4s.**; VII. 6, 7, 9, 10, 11, 13, 15, 16, **4s.** each; VIIA. 9, **4s.**; VIII. 9, **5s.**; 10, 11, 13, **4s.**; 14. **5s.**; 16, **4s.**; IX. 13, **4s.**; XVI. 3, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, **4s.** each; XVII. 2, 5, 6, 8, 9, 13, 14, **4s.** each; 15, **3s.**; 16, **4s**; XIX. 3, **3s.**; 8, **3s.**; 9, **4s.**; 14, **3s.**; XXXII. 1, **4s.**; CXII. 3, 4, 7, 8, **4s.** each; 12, **5s.**; CXIII. 9, 12, 14, **4s.** each; CXXXIII. 5, 10, 16, **3s.** each; CL. 14, **4s.**; CLXIV. 15, **4s.**; CLXXXIV. 9, 15, **4s.** each; CXCVIII. 6, **4s.**; CC. 4, **11s.** 6*d.*; CCLXX. 7, **5s.** (coloured).

Town Plans—5-feet scale:—

London (Revision), with houses stippled, VI. 18; IX. 39, **2s.** 6*d.* each.

——— 10-feet scale:—

London—Re-survey (Hornsey Parish), III. **33,** 2, 4; III. **41,** 4; III. **43,** 2; III. **44,** 2; III. **54,** 2; III. **64,** 1, with houses stippled, **2s.** 6*d.* each.

——— 10½-feet scale:—

Plymouth and Environs (Revision), CXXIII. **11,** 19; CXXXIII. **12,** 8. This town is now complete in 79 sheets, **2s.** 6*d.* each. Index, 6*d.*

(*E. Stanford, Agent.*)

Germany. **Lepsius.**

Geologische Karte des Deutschen Reichs-auf Grund der unter Dr. C. Vogels Redaktion in Justus Perthes Geograph. Anstalt ausgeführten Karte in 27 Blättern berbeitet von Dr. Richard Lepsius. Scale 1 : 500,000 or 7·6 stat. miles to an inch. Lieferung II. Sheets—17, Köln; 23, Stuttgart. Justus Perthes, Gotha, 1894. *Price* 3 *marks each part.*

Italy. **Instituto geografico militare, Firenze.**

Carta d'Italia. Scales 1 : 25,000 or 2·5 inches to a stat. mile, and 1 : 50,000 or 1·3 inch to a stat. mile. Sheets—54 I., Moncenisio; 54 II., Oulx; 54 III., Bardonecchia; 55 II., N.E., Almese; 55 II., S.E., Giaveno; 55 II., S.O., Coazze; 55 II., N.O., Condove; 55 III., S.E., Roure; 55 III., N.E., Bussoleno; 55 III., S.O., Fenestrelle; 55 III., N.O., Susa; 66 I., Cesana Torinese; 67 I., N.O., Pinasca; 67 I., S.O., S. Secondo Pinerolo; 67 I., S.E., Pinerolo; 67 I., N.E., Cumiana; 67 II., Cavour; 67 III., Monte Viso; 67 IV., Perosa Argentina; 78 I., Monte Chambeyron; 78 II., Argentera; 79 I., Revello; 79 II., Dronero; 79 III., Prazzo; 79 IV., Sampeyre; 90 I., Demonte; 90 II., Madonna Delle Finestre; 90 III., Molières; 90 IV., Vinadio. Instituto geografico militare, Firenze. *Price* 1 *li.* 50 *centimes each sheet.*

ASIA.

Arabia. **Tweedie.**

Map of the Country of the Arabian Horse, 1894. Scale 1 : 4,500,000 or 71·8 stat. miles to an inch. Specially prepared by Major-Gen. Tweedie for his book, 'The Arabian Horse.' W. Blackwood & Sons, Edinburgh.

This is a sketch-map on which the routes of travellers in Arabia, since 1819, are laid down. British consulates, and minor agencies are also shown. The map has been specially prepared by Major-Gen. Tweedie for his work, 'The Arabian Horse,' and the routes by which horses are marched eastward for export are shown.

Indian Government Surveys. **Surveyor-General of India.**

Indian Atlas. Quarter Sheets: No. 12 N.E., parts of Cutch and Kathiawar Agencies (Bombay Presidency); 23 N.E., parts of districts Ahmedabad, Broach, and Surat, and of Native States Bhavnagar, Baroda and Rewa Kantha (Bombay Presidency); 25 S.E., parts of districts Poona, Kolaba, and Ratnagiri, and of Habsan and Bhor States (Bombay Presidency); 90 N.W., parts of district Mandla (Central Provinces), and Rewa (Native State); 105 N.E., parts of districts Palaman, Lohardaga, and Singhbhum, and of Jushpur State (Chota Nagpur), Bengal; 126 N.W., parts of districts Dacca, Mymensingh, Tippera, Sylhet, and Hill Tippera.—Sheets: No. 79, parts of districts Tanjare, Trichinoply, Salem, Coimbatore, Madura, and South Arcot (Madras Presidency), Pondicherry (French territory).—India with additions to railways to 1893, scale 128 miles to an inch.—India, Rice, 64 miles to an inch, 1893.—India, Cotton, 64 miles to an inch, 1893.—India, Sugar-cane, 64 miles to an inch, 1893.—Bengal Survey, 1 inch to a mile, Sheet No. 221, districts Balasore and Cuttack, Killa Kanika and Killa Kujang, Seasons 1888 to 90; 247, districts Cuttack and Balasore (Killa Kanika), Seasons 1888 to 90.—Bombay Survey, 1 inch to 2 miles, half degree, Sheet No. IX., north.—Sheets No. 42 and 57 (Rajputana), and 68 and 85 (Bombay). Parts of Sind and of Jodhpore and Palanpur States, Seasons 1878–79 and 90–91.—Upper Burma Survey, 1 inch to a mile, Extract from Sheets No. 260 and 261, city of Mandalay and Environs, Seasons 1886–88 and 1890–91, 2 sheets; 263, district Kyaukse, Season 1889–90.—South-eastern Frontier, 1 inch to 4 miles, No. 1 S.W. (4th edit.), parts of the Chin Hills, of the districts of Upper Chindwin and Pakokku (Upper Burma), of Northern Arakan (Lower Burma), and of districts Chittagong Hill Tracts, South Luahai Hills, and Chittagong (Bengal), Seasons 1853–66, 1871–72, 1888–90, and 1891–92; No. 4 S.E. (4th edit.), part of Northern Shan States, Seasons 1887–1892.—South-eastern Frontier, 1 inch to 8 miles, No. 1 (4th edit.), parts of North Lushai Hills (Assam), of Chin Hills, and the districts of Upper and Lower Chindwin, Katha, Shwebo, Ye-u, Pakokku, Sagaing, and Mandalay (Upper Burma), of Northern Arakan (Lower Burma), and of the districts Chittagong, South Lushai Hills, Chittagong Hill Tracts, and

Hill Tippera (Bengal), 1894.—North-eastern Frontier, 1 inch to 4 miles. No. 23 s.w. (8th edit.), parts of districts Bhamo, Katha, Ruby Mines, and Mongmit (Upper Burma), Seasons 1887–93.—North-eastern Frontier, 1 inch to 8 miles, No. 22 (5th edit.), parts of districts Lakhimpur (Assam), of Singpho-Naga Hills, Hukong Valley, and Bor Hkamti country.—Aden Survey, 1 inch to 4 miles, part of Arabia, Season 1891–92.—Upper Burma, 64 miles to an inch, with additions and corrections to January, 1894.—Bengal, 80 miles to an inch, July, 1888.—Bombay Presidency (exclusive of Sind), 32 miles to an inch, October, 1891.—British Burma, Pegu Division, 1 inch to 4 miles, Sheet No. 1, parts of districts Thayetmyo, Henzada, Tharrawaddy, Bassein, and Arracan, with additions to railways up to 1891; No. 3, districts Toungoo and parts of Prome, Tharrawaddy, Pegu, Thayetmyo, and Henzada, with additions to railways up to 1891.—Map of the Allahabad Division, prepared in accordance with Government N.W.P., P.W. Department, Circular No. E, dated May 16, 1872, revised to April 1, 1892, 1 inch to 4 miles.—District Nadia Presidency Division, Lower Provinces, Bengal, 4 miles to an inch, with additions and corrections up to May, 1892.—District Palaman, Lower Provinces, Bengal, 4 miles to an inch, January, 1894.—District Bhamo, Upper Burma, 8 miles to an inch, December, 1894.—District Kheri, N.W. Provinces and Oudh, 8 miles to an inch, 1894.—District Muzaffarpur, Bengal, 8 miles to an inch, 1890.—District Puri, Bengal, 8 miles to an inch, 1890.—District Lohardaga, Bengal, 16 miles to an inch, 1894.—Index to relative positions of gold-mining and prospecting grants, district Katha, surveyed and demarcated, June, 1893; 2 miles to an inch, January, 1894. *Presented by H.M. Secretary of State for India, through India Office.*

AFRICA.

Algeria. **Service Géographique de l'Armée, Paris.**

Carte topographique de l'Algérie. Scale 1 : 50,000 or 1·26 inch to a stat. mile. Service Géographique de l'Armée, Paris. Sheet 92, Le Bon Sellam. *Price* 1 *fr.* 50.

East Africa. **Höhnel.**

Darstellung der hauptsächlichsten Constructions-Elemente für die Karte des nord-östl. Keniagebietes gesammelt während William Astor Chanler's Expedition, 1892–93, von Lieut. von Höhnel. Scale 1 : 750,000 or 11·8 stat. miles to an inch. Petermann's 'Geographische Mitteilungen' Jahrgang, 1894, Taf. 14. Justus Perthes, Gotha. *Presented by the Publisher.*

AMERICA.

United States. **Rand, McNally & Co.**

Indexed County and Township Pocket Map and Shippers' guide of—
Arizona, scale 1:1,708,200 or 26·9 stat. miles to an inch.
Colorado, „ 1:1,014,700 or 15·9 „ „ „
Idaho, „ 1:1,660,000 or 26·2 „ „ „
Rand, McNally & Co., Chicago & New York, 1894. *Price* 25 *cents each.* *Presented by the Publishers through E. Stanford.*

These are new editions of a series of maps which contain a great deal of information in the accompanying letterpress that will be useful to persons visiting the United States on business or for pleasure.

South America. **Payer.**

Orignalkarte des Rio Napo und Rio Curaray. Nach eigenen Aufnahmen in Dampfer "Putomayo," März bis Mai, 1890, Gezeichnet von Richard Payer. Mitglied der wissenschaftl. Komission von Peru (Gesetz v. 4 Nov. 1887). Scale 1 : 800,000 or 12·6 stat. miles to an inch. Justus Perthes, Gotha. Petermann's 'Georgr. Mitteilungen.' Jahrgang, 1894, Tafel 13. *Presented by the Publisher.*

AUSTRALASIA.

Queensland and British New Guinea. **Surveyor-General of Queensland.**

Queensland and British New Guinea. Constructed at the Surveyor-General's office, Brisbane, from the most recent surveys and information

obtainable, with additions and corrections to 1894. Scale 1 : 1,013,760 or 16 stat. miles to an inch. Printed and published at the Surveyor-General's office, Brisbane, 1894. *Presented by the Surveyor-General of Queensland.*

This is a ten-sheet map of Queensland and New Guinea, in which all the latest material has been used to bring it up to date.

Western Australia. **Calvert.**

Albert F. Calvert's Map of Western Australia, showing the Goldfields. Scale 1 : 6,000,000 or 94·9 stat. miles to an inch. J. J. Bartholomew, Edinburgh, 1894. *Presented by the Author.*

GENERAL.

Ancient Geography. **Kiepert.**

Henrici Kiepert. Formæ Orbis Antiqui. 36 Maps. First Part. Published by Dietrich Reimer (Hoefer and Vohsen), Berlin, 1894. *Price 5s. each part.*

This is the first issue of an atlas of ancient geography which is to be completed in six parts, each containing six maps, accompanied by explanatory letterpress. In the preface Dr. Henry Kiepert gives a historical sketch of the work that has been done in this direction since the middle of the last century, and the principles he has followed in the production of this atlas. The present issue contains the following maps: No. IX., Asia Province; No. XII, Insulæ Maris Ægaei; No. XV., Græcia Septentrionalis; No. XVII., Illyricum et Thracia; No. XXVI., Insulæ Britannicæ; No. XXVII., Hispania. Accompanying the maps is a table which will be found convenient for converting the heights, given in decameters, into English feet. The maps are excellent specimens of cartography, and this atlas bids fair to be of great service to students of historical geography.

German Colonies. **Langhans.**

Deutscher Kolonial-Atlas. 30 Karten mit vielen Hundert Nebenkarten, entworfen, bearbeitet und herausgegeben von Paul Langhans, Siebente Lieferung. Gotha: Justus Perthes, 1894. *Price, 1 mark 60 pf. each part.*

Part VII. contains maps of the distribution of Germans in Europe, with numerous insets, and sheet No. 1 of a four-sheet map of German South-West Africa. This atlas will be completed in fifteen parts, each containing two maps.

The World. **Debes.**

E. Debes' Neuer Handatlas über alle Teile der Erde in 59 Haupt-und weit über 100 Nebenkarten, mit alphabetischen Namenverzeichnissen. Ausgeführt in der geographischen Anstalt der Verlagshandlung. Leipzig: H. Wagner and E. Debes. Parts 5, 6, 7, 8, 9, and 10. *Price, 1·80 marks each. Presented by the Publishers.*

Part V. contains maps of Belgium, Holland, France, and Northern Asia. Part VI., maps of the German Empire, Bohemia, Moravia, and Silesia, and the United States. Part VII., maps of North Germany, the British Isles, and Palestine. Part VIII., maps of North-West Germany, South Asia, and Central South America. Part IX., a commercial map of the World, on Mercator's projection, on which the positions and extent of all colonies are shown as well as the tracks followed by steamers. There are insets illustrating the results of missionary efforts up to 1880, the postal and telegraph systems of the World, and the means of communication by railways, roads, rivers, etc.; and maps of the eastern portion of the Alps, and European Russia. Part X., a language and ethnographical map of Europe, and maps of Denmark, Scandinavia, Australasia, and Polynesia.

In addition to the principal maps, there are numerous insets and full explanations of the symbols and colours employed. The manner in which the maps have been produced leaves nothing to be desired, and each is accompanied by an index.

The World. **Vidal-Lablache.**

Atlas général Vidal-Lablache. Histoire et Geographie. Index alphabétique de plus de 40,000 noms. Paris: Armand, Colin & C^ie^, Editeurs. *Price 2 fr.*

With the issue of the present part, which contains the index, this useful general atlas is complete. There are 137 principal maps, and 248 diagrams and insets. Fifty-two of these are devoted to historical geography, and every map in the atlas is accompanied by useful notes. They are all drawn in a clear style, and overcrowding with place-names has been avoided. Taken as a whole, it is a very useful atlas for general reference and educational purposes.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published at the Hydrographic Department, Admiralty, July and August, 1894. *Presented by the Hydrographic Department, Admiralty.*

No.	Inches.	
1974 m =	1·4	Norway, south-coast:—Jœlöen to Christiania, and including Drams Fiord. 2*s.* 6*d.*
1971 m =	1·0	Norway, west coast:—Approaches to Trondhjem, western Sheet. 2*s.* 6*d.*
1805 m =	0·5	France, south coast:—Cette to Marseille. 2*s.* 6*d.*
798 m =	1·53	France, west coast:—Douarnenez bay and approach (plan Douarnenez and Tréboul). 2*s.* 6*d.*
1976 m =	0·27	Italy, west coast:—Cape Bonifati to Strait of Messina. 2*s.*
2110 m =	1·84	Anchorages in south-east Alaska:—Gambier Bay, Woewodski and Eliza harbours, Fanshaw bay and Cleveland passage. 2*s.* 6*d.*
2066 m =	3·56	Comoro islands:—Mtamuhuli, Shindini Fumboni bays and road, Pomoni harbour, Mutsamudu and Patsi roads. 1*s.* 6*d.*
655 m =	6·0	Port of Bombay. 2*s.* 6*d.*
2153 m =	9·67	Strait of Malacca:—Kwala Klang. 1*s.* 6*d.*
264 m =	2·7	Cochin China:—Kin How, or Thi-nai harbour, Huć river entrance. 1*s.* 6*d.*
m =	3·6	
1644		Komandorski islands:—New Plan, Nikolski anchorage.
2069 m =	1·0	New Caledonia:—Approaches to Port Noumea. 1*s.* 6*d.*
1378 m =	11·89	Sandwich Islands:—Honolulu harbour. 1*s.* 6*d.*
1588 m =	6·2	Anchorages on south coast of Spain:—Plan added, Almeria road.
1692		Anchorages on the coast of Morocco:—Plan added, Alhucemas bay.
981		Scinavina Islands:—Plan added, Port Santiago.

J. C. Potter, agent.

Charts Cancelled.

No.	Cancelled by	No.
2330 Plan of Christiania-fiord on this sheet.	New Chart. Joelöen to Christiania	1974.
2605 France, south coast, Sheet III. 2606 France, south coast, Sheet IV.	New Chart. Cette to Marseille	1805
1692 Plan of Mazari bay on this sheet.		
2762 Plans of Fumboni bays and road, Johanna road, and Pomony harbour on this sheet.	New Plan. Anchorages in Comoro islands	2066
8D Plan of Village bay on this sheet.	New Plan on Chart	8D
264 Kin Hon or Thi-nai harbour.	New Plan. Kin Hon or Thi-nai harbour on new Chart	264
2405 Plan of Little Kuril strait on this sheet.		
1378 Honolulu harbour.	New Plan. Honolulu harbour	1378

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

30'
19°
SARAJEVO
B O S N I A
Goražda
Čajnica
Foča
30'
Drina R.
Drina R.
Lehotina R.
Hum
Piva R.
Tara R.
Gacko
Durmitor
Čirova
Žabljak
Gorinsko
Piva Monastery
Jezera (Lakes)
Kazanci
Krstac
43'
Sušica R.
Tara R.
Sarak
Tara R.
Morača R.
M O N T E N E G R O
Old Boundary
Nikšić
Morača Monastery
Ostrog Monastery
Grahovo
Zeta R.
Danilov Grad
Risano
Spuž
Bioče
30'
Duka
Njegus
Cattaro
Podgorica
Bocche di Cattaro
Cetinje
Rijeka
Zem.
Tarbazar
Stanivo I.
Antivari
A D R I A T I C
S E A
42°
Dulcigno
30'
Longitude 19° East of Greenwich.
Published by the R

30' 20° 30'

S E R V I A

Morava R.

Prijepolje

Uvac R.

Lim R.

Nova Varos

Taslidja (Plevlje)

Prijepolje

Lim R.

Sjenica

S A N D J A K O F

JENIPAZAR (NOVIBAZAR)

N O V I B A Z A R

Bijelopolje (Akova)

43'

Biogradsko L.

Šiska L.

Lim R.

Tara R.

Budimlje

Berane

Rožaj

Kolašin

G R O

Vrnecka

V A S O J E V I Ć

Andrijevica

Kom Mt.

Lim R.

Plavnica

Ipek

Maglić Mt.

Velipoje R.

Plava

Plava L.

Rikavac L.

Gusinje

Bioče

Seljci

Medun

Zamet Bay

Zem R.

30'

L I M

P r o k

A L B A N I A

Djakova

SKETCH MAP OF

MONTENEGRO ALBANIA AND NOVIBAZAR

Showing the Route of Mr W.H.Cozens Hardy.

Route

Natural Scale 1:600,000

One inch = 9·5 miles.

Montenegrin Boundary before the Berlin Treaty

after

Turkish Boundary after

The local spelling of names has been followed.

PRONUNCIATION

c-ts j-y.
ć-tj š-sh.
č-ch ž-z (in azure)

SCUTARI LAKE

Vruka

SCUTARI

Bojana R.

St Sergius

Drin R.

42'

30' 20°

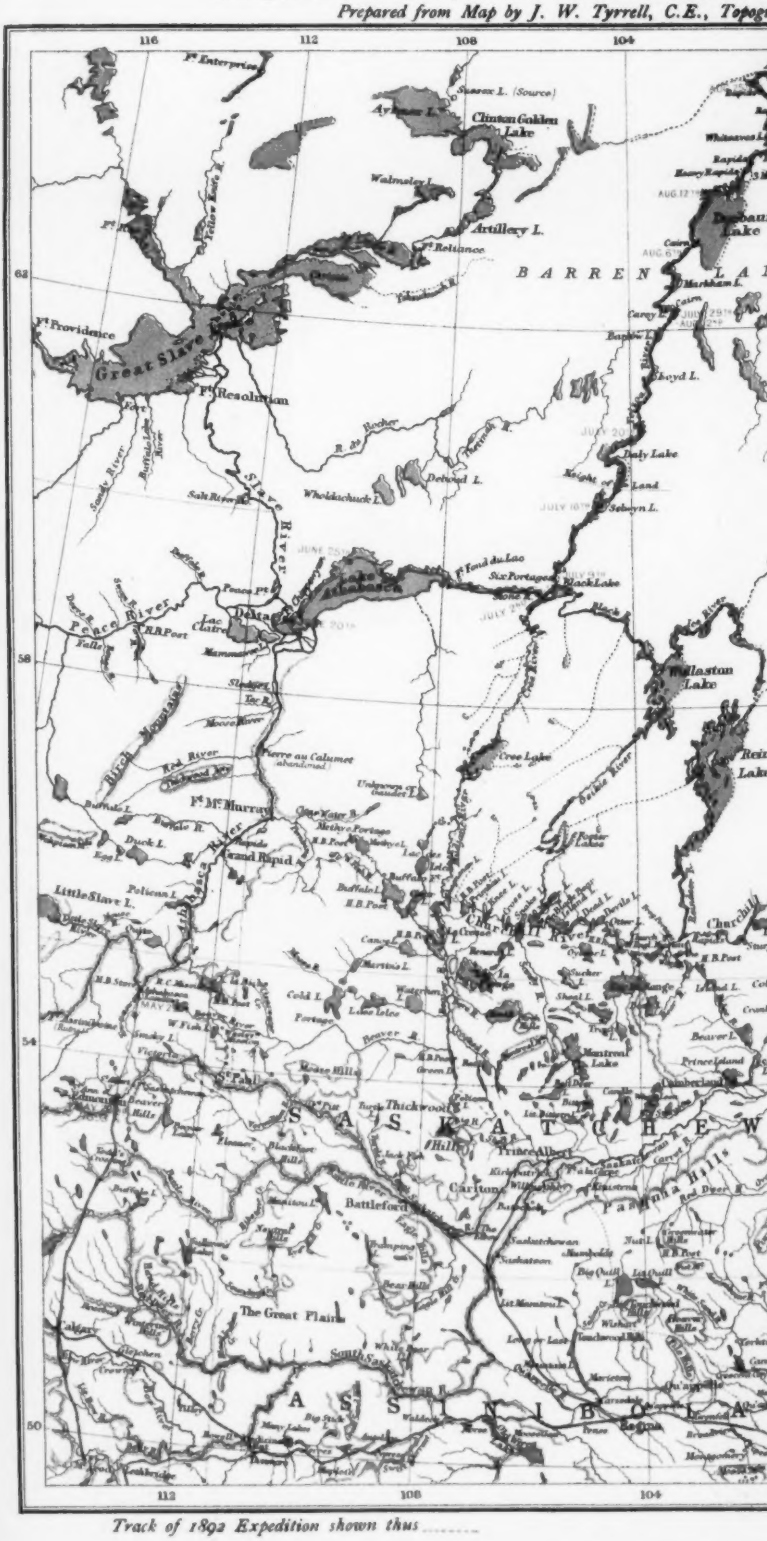
the Royal Geographical Society.

F.S.Weller, lith.

MAP OF NORTHERN C

Showing the Routes followed by J. BURR TYRRELL in 1892 and 1893 w

Prepared from Map by J. W. Tyrrell, C.E., Topog



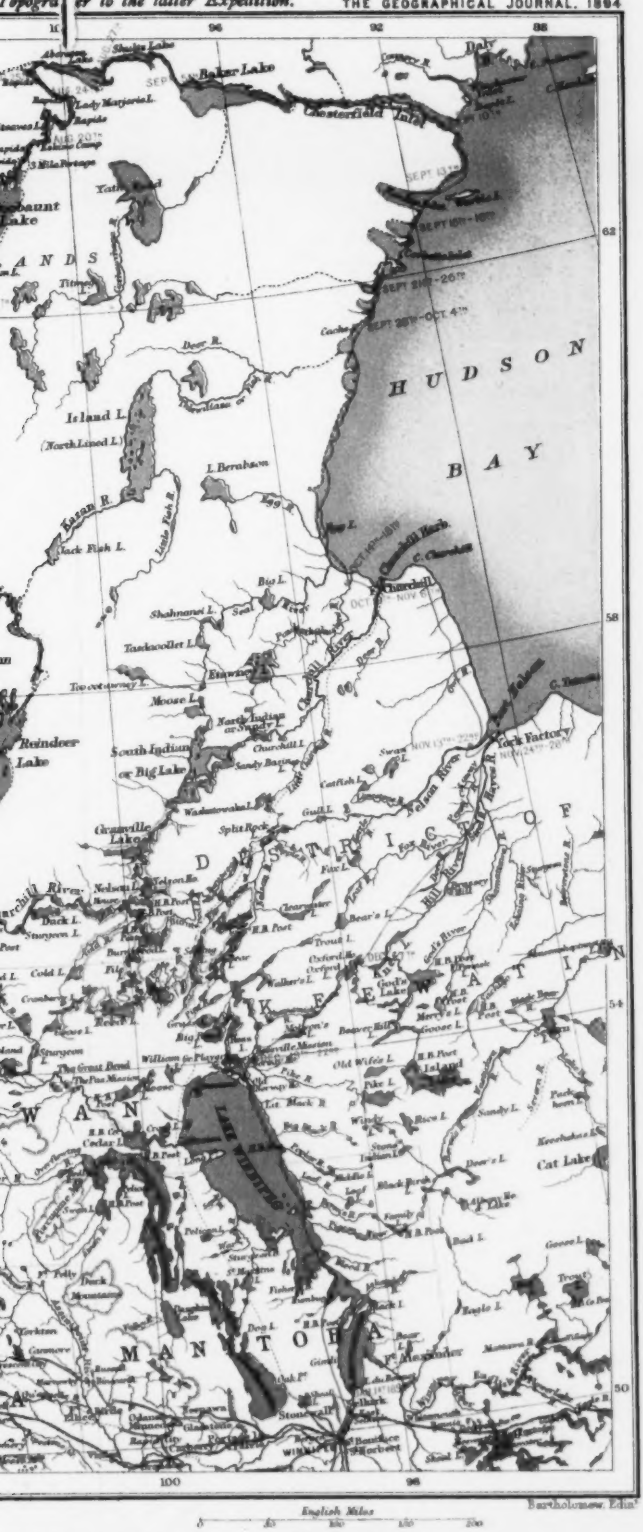
Track of 1892 Expedition shown thus .....

" *1893* " " " ——— *Published by the Royal Geogr*

RN CANADA

1893 wh[illegible] in charge of Geological Survey Expeditions.

Topogra[illegible]er to the latter Expedition.


Baker Lake
Chesterfield Inlet
Yathkyed L.
Tittaut L.
Deer R.
Island L.
(North Island L.)
L. Berrabeen
Kazan R.
Jack Fish L.
Little Fish R.
HUDSON
BAY
Churchill
Churchill River
Shahnarei L.
Tadcaster L.
Moose L.
Reindeer Lake
South Indian or Big Lake
North Indian or Small L.
Granville Lake
Split Rock
Duck L.
Sturgeon L.
Cold L.
Cranberry L.
Beaver L.
Sturgeon L.
Big L.
Trout L.
Oxford L.
Walker's L.
Bear's L.
Fox L.
Clearwater L.
Gods River
Gods Lake
Island
Old Wife's L.
Pike L.
Lat. Black R.
Windy Lake
Cedar L.
Cat Lake
Deer's L.
Trout L.
Eagle L.
Manitou L.
Manitou R.
Stonewall
Rock Factory
Swan R.
Kazan River
Gulf L.
Washatowaka L.
Caribou L.
Fox L.
Nelson R.
Nelson Ho.
Thicket Portage
Oxford House
Island
Beaver Hill L.
Goose L.
Mercy's L.
Knee Lake
Knee Lake Ho.
Wapisu L.
Packhorse L.
Sandy L.
Goose L.
Trout L.
Eagle L.
Rock L.
Beaver L.
Manitou R.
Manitou L.
Stonewall
Stony Mountain
Selkirk
Winnipeg
Portage la Prairie
Rapid City
Carberry
Brandon
Rapid
Lady Marjorie L.
3 Mile Portage
Yathkyed
Tittaut
Deer R.
Cochrane R.
Island L.
Berrabeen
Kazan R.
Jack Fish L.